VALVES AND FITTINGS

FOR

DISTRIBUTION MAINS

CATALOGUE No. 96

J. Blakeborough & Sons Ltd.
BRIGHOUSE, ENGLAND.

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CATALOGUE No. 38.

DISTRIBUTION MAINS

FOR

VALVES AND FITTINGS

VALVES AND FITTINGS
FOR
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Contractors to
THE CROWN AGENTS FOR THE COLONIES
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THE LONDON COUNTY COUNCIL
THE PRINCIPAL CORPORATIONS and
FOREIGN GOVERNMENTS

Foreword

It is no idle boast to say that " Blakeborough " Valves and Fittings have established for themselves an unrivalled reputation for reliability and hard wearing qualities.

This distinction has been achieved by persistent effort extending over a period of over 90 years in producing Valves and Fittings which could always be absolutely relied upon to give satisfactory service under the most severe working conditions, and by the exercise of zealous and unremitting care that nothing should be allowed to leave the works which fell short of the high standard of quality which, at all costs, the management are resolutely determined to maintain.

All the resources of extensive factories, replete with modern machinery and highly-skilled craftsmen, are concentrated upon the production of " Blakeborough " Specialities, and from the most important operation to the most trivial detail, extreme care and thoroughness are exercised, all work being subjected to searching inspection and tests during the various processes of manufacture, and upon completion.

A staff of Expert Draughtsmen is constantly employed on the design of Valves and kindred appliances for waterworks and other purposes, and Engineers having Valve problems are invited to make use of the facilities afforded by the wide and varied experience gained during a lifetime's association with this class of work.

By specifying " Blakeborough " Valves and Fittings, Civil Engineers engaged upon the design and construction of waterworks schemes will be studying the best interests of their clients by ensuring the installation of appliances which will require the minimum amount of care and expense in upkeep, accompanied by an entire absence of anxiety to those subsequently in charge of the works.

A cordial invitation is extended to Engineers and others engaged upon the design, construction and management of waterworks to visit our works and inspect the methods of manufacture and testing in actual operation.

J. BLAKEBOROUGH & SONS Ltd.

WOODHOUSE WORKS,
BRIGHOUSE.

Materials and Workmanship

MATERIALS. The materials we use are the best and are selected by analysis in our Works Laboratory, the greatest care being exercised in their selection and testing to ensure obtaining the most suitable quality for their respective purposes. The composition of all metal alloys, etc., is also determined by analysis.

IRON CASTINGS are made from Selected Mine Pig only, the brands used and the proportions of mixing being based on experience extending over 60 years. All castings are clean, close-grained, and of exceptional toughness. Test Bars are cast daily and may be seen broken by appointment.

STEEL CASTINGS are made by the Siemens Martin Open Hearth Process, and are scientifically annealed. The castings produced are of a particularly high quality, capable of withstanding the severe stresses to which they are exposed in modern high pressure systems.

GUN-METAL CASTINGS are all made from best selected Ingot Metals. The composition was adopted many years ago after exhaustive tests, and results have confirmed its extreme suitability for Valve Faces, etc., possessing as it does, exceptional wearing qualities.

FORGED BRONZE. All Valve Spindles are of Forged Bronze, and possess much greater strength than the ordinary "Cast" Spindles generally adopted by other makers. The Forgings are uniform in quality and free from defects of any kind.

MILD STEEL. All Steel Forgings are made of Best Quality Mild Steel manufactured by the Open Hearth or Bessemer Process, Acid or Basic, possessing a high tensile strength.

WROUGHT IRON. All Wrought Iron used for Forgings, Bolts, etc., is of Best Selected Yorkshire Iron, capable of being bent double without showing signs of fracture.

WORKMANSHIP. The workmanship is of the highest class, experienced workmen having specialised knowledge in this particular branch of engineering being exclusively employed. By the use of modern machinery and plant, specially designed for the manufacture of Valves and kindred appliances, strict accuracy and interchangeability of parts is ensured whilst every care is taken by constant supervision, gauging and testing to preserve uniformity of results.

COATING. Unless otherwise ordered, all Iron Castings are coated with Dr. Angus Smith's Solution on the latest approved principle, the Castings being first immersed in boiling water to remove all sand, etc.

TESTS. The following table gives the results of actual tensile tests which have been made recently at our works on the various metals.

TENSILE TESTS

DESCRIPTION	Size in Inches	Area Square Inches	Distance between Gauge Points in Inches	Max. Stress, Tons per Square Inch	Elongation per cent.
Cast Iron	·740	·43	—	13·20	—
Gun-metal	·564	·25	2	15·32	17·0
Mild Steel	·564	·25	2	30·00	34·0
Wrought Iron	·564	·25	2	22·52	24·0
Forged Bronze	·564	·25	2	30·00	35·0

Terms

PRICES. Owing to the abnormal conditions existing at date of publication, no prices are stated in this catalogue, but Price Lists will be published from time to time giving current prices for those items which in more normal times would be priced. Quotations will also be sent without delay for customers' actual requirements upon receipt of particulars.

CREDIT ACCOUNTS. Orders from firms with whom we have had no previous business transactions must be accompanied by two or three references to firms of standing in this country, otherwise our terms are cash with order.

PAYMENT. Our terms of payment for credit accounts are strictly nett cash on 10th of month following delivery of goods for the home trade, and nett cash against presentation of shipping documents in London for export, unless otherwise arranged.

THE ILLUSTRATIONS are typical, and represent as nearly as possible what we supply, but as modifications and improvements are made from time to time, we do not guarantee that the goods supplied are in all cases identical with the illustrations.

DIMENSIONS where given, are for the general information of intending buyers, and are believed to be correct, but must be taken as approximate only.

CARRIAGE. We pay carriage per goods train on all orders of £6 value and upwards to any railway station in the United Kingdom, or F.O.B. English port for export.

PACKAGES AND PACKING are charged extra, but if returned in reasonable time and in good condition, carriage paid, are allowed for in full. All returned packages must bear sender's name, and an advice should be sent by post.

DAMAGE IN TRANSIT. The customer's signature on the carrying company's receipt form will be an acknowledgment of safe delivery; in the event of any goods being received broken, or a discrepancy in the number, the Railway Bill should be signed accordingly and notice given to us forthwith. Goods damaged in transit should be returned by the same carrier or railway, consigned "Carriage Free—Broken in Transit."

"Blakeborough" Sluice Valves

"Blakeborough" Sluice Valves are made in three regular standard strengths: **heavy, medium and light.** In addition to the three types, a special range of patterns is adapted for valves required for exceptionally high working pressures. These valves are of extra strong section, and are made either in Cast Iron or Steel as required.

The heavy pattern is the Standard Waterworks Valve, and is supplied in two grades, *viz.*: "A" and "B."

Grade "A" possesses all the features recommended for high-class Waterworks practice, as a glance at the illustrations and specification will reveal.

Grade "B" is exactly the same pattern as Grade "A," but with Gun-metal Bushes, etc., omitted and with Cast Iron Bridge.

The medium pattern is modelled on similar lines to the Heavy Pattern, but is lighter in section.

The light pattern is not listed in this section. Full particulars may, however, be obtained on application.

All grades of Blakeborough valves have the following exclusive features embodied in their construction.

¶ Patent Face Rings of best selected hard Gun-metal, securely dovetailed in position and guaranteed absolutely watertight and not to work loose.

¶ Elliptical Body, a shape obviously better able to withstand internal pressure than the old type of flat-sided body.

¶ Solid Flanges all around the Body and Cover, thereby adding strength and avoiding the use of lugs to receive Bolts.

¶ Jointing Surfaces faced fully across, the jointing material extending over the whole surface of the Flanges.

¶ Double Socket Valves have the Sockets cast away from the Body in order to maintain an even thickness of metal.

¶ Valves up to and including 8 in. bore have a Dome-shaped Bridge capable of withstanding enormous strains without fear of fracture.

All "Blakeborough" Valves open ↷ *unless otherwise ordered.*

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "A"

Specification

BODY. The Body is of Cast Iron with all Flanges faced right across. The Connecting Flanges of Valves are drilled to British Standard Table No. 1. The shape of the Body is elliptical to gain maximum strength, and internal guides are provided to hold the Valve Door in position. Dovetailed recesses are machined in the Body to receive the Gun-metal Faces.

COVER. The Cover is of Cast Iron with the Flanges faced right across. For all sizes above 8 in. bore the thrust collar on Spindle rests upon a Gun-metal Washer recessed in the top Flange of Cover. In the smaller sizes a separate Gun-metal Bridge is provided for this purpose.

STUFFING BOX. The Stuffing Box is of Cast Iron, and is bored to receive the Gland. A Gun-metal Bush or Neck Ring is fitted in the bottom of Stuffing Box. The Gun-metal Neck Ring is tapered and ground in with a Coned Spindle to enable the Valve to be re-packed under pressure.

GLAND. The gland is of Cast Iron turned outside to fit the Stuffing Box, and bored and bushed with Gun-metal to suit the Spindle, and is attached to the Stuffing Box by two Tee-headed Bolts screwed up by Gun-metal Hexagon Nuts. The word "OPEN" and an arrow indicating the direction of opening are cast in legible characters on the top of the Gland.

DOOR. The Door or Plug is of Cast Iron, with Dovetailed recesses machined in both sides to receive the Gun-metal Faces. Long Guides are cast on each side to prevent chattering. The Guides extend to the top of the Nut Box, adding increased strength to this important part.

FACES. The Faces are of best selected Hard Gun-metal, machined to correspond to dovetailed recesses in Body and Door respectively, and forced firmly into position by hydraulic pressure, so that they cannot possibly work loose nor can any leakage take place behind the Faces. Upon final assembling the Faces are hand scraped to a perfect bearing which renders the Valve absolutely drop tight under the specified test pressure.

SPINDLE AND NUT. The Spindle is of Solid Forged Bronze ground all over to a working clearance of ·015 in., and having a machine-cut right-handed square thread of $\frac{1}{2}$ in. pitch. The Spindle Collar is coned and ground to make a water-tight joint with the Bush in the lower portion of the Stuffing Box, enabling the Stuffing Box to be re-packed under pressure. The Gun-metal Nut also has a machine-cut thread to suit Spindle. All Spindles and Nuts are interchangeable in the same size of Valve.

CAP. The Cap is of Wrought Iron, fitted on a square formed at top of Spindle, and is secured with a Steel Taper Pin.

JOINTS AND PACKING. All Body Joints are made of Stout Mill-board. In the case of Valves with Spigot and Socket Ends, the Connecting Flange Joints are made of Gutta-percha. The Stuffing Box is packed with Lubricated Mica Frictionless Packing.

TESTING. All Valves up to and including 12 in. are hydraulically tested to 800 ft. head, and the larger sizes to 600 ft. head, the pressure being applied at both sides of the Door when closed, and to the whole interior of the Valve when the Door is open.

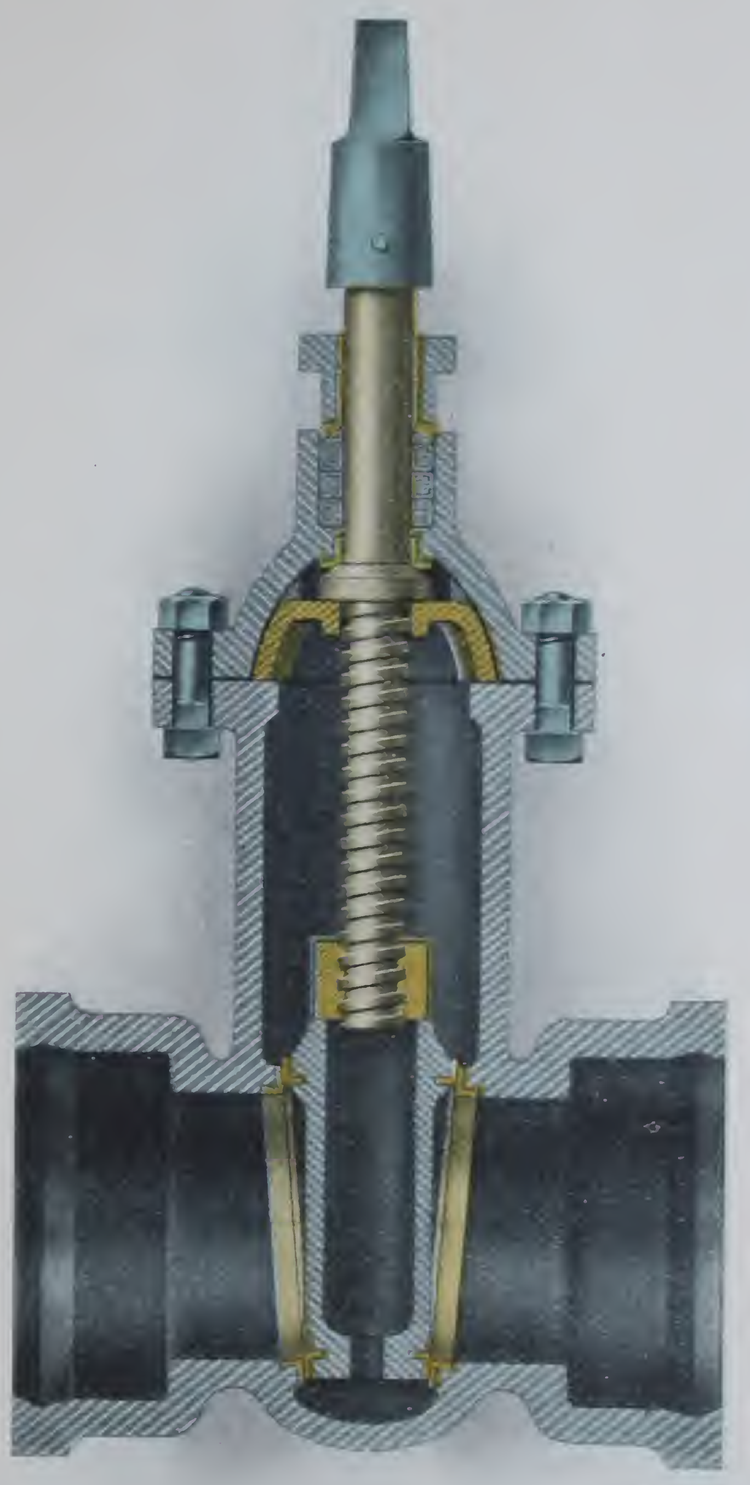
INSPECTION. Valves may be inspected at any time whilst in course of manufacture and on test, every facility being afforded the inspector in his examination. Customers not wishing to witness the tests personally may be provided with certificates of tests if desired.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "A"

Type of Valve for sizes up to and including 8 in. Bore.

Test Pressure—
800 ft. Head.



Working Pressure—
up to 400 ft. Head.

Fig. 2256.

For Schedules of Dimensions see pages 11 to 13.

For Heavy Waterworks Pattern, Grade " B " Valves, see page 15.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "A"

Fig. 2256.

For Schedules of Dimensions see pages 11 to 13.

Fig. 2257.

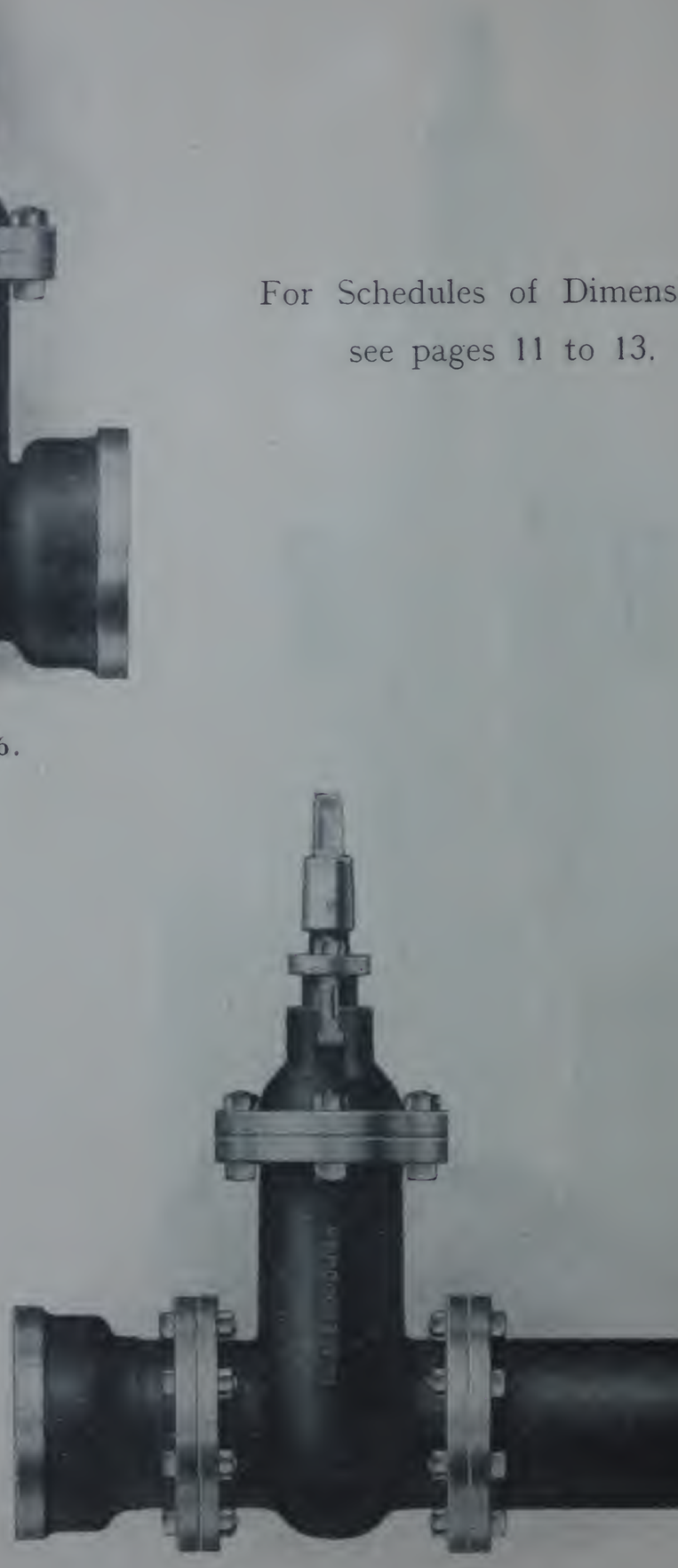


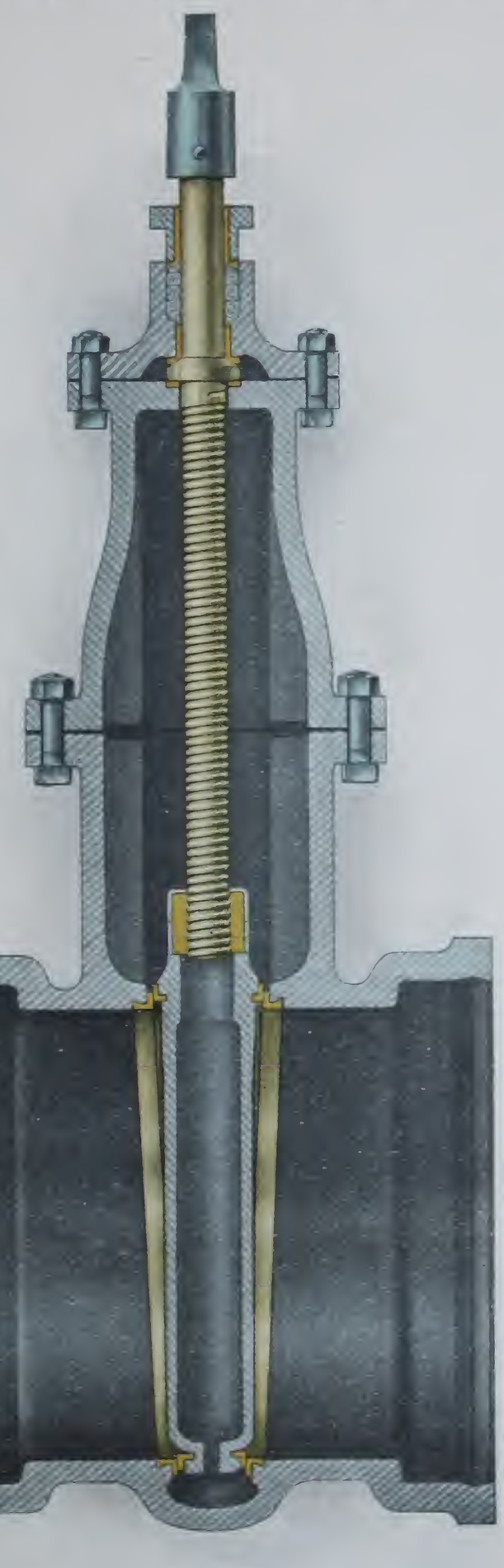
Fig. 2258.

For Heavy Waterworks Pattern, Grade " B " Valves, see page 16.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "A"

Type of Valve for all sizes above 8 in. Bore.



Test Pressures—

Sizes 9 in. to 12 in., 800 ft. Head.

Sizes 13 in. and upwards, 600 ft. Head.

Working Pressures—

Sizes 9 in. to 12 in., up to 400 ft. Head.

Sizes 13 in. and upwards, up to 300 ft. Head.

Fig. 2265.

For Schedules of Dimensions see pages 11 to 13.

For Heavy Waterworks Pattern, Grade " B " Valves, see page 17.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "A"

For Schedules of Dimensions
see pages 11 to 13.

Fig. 2265.

Fig. 2266.

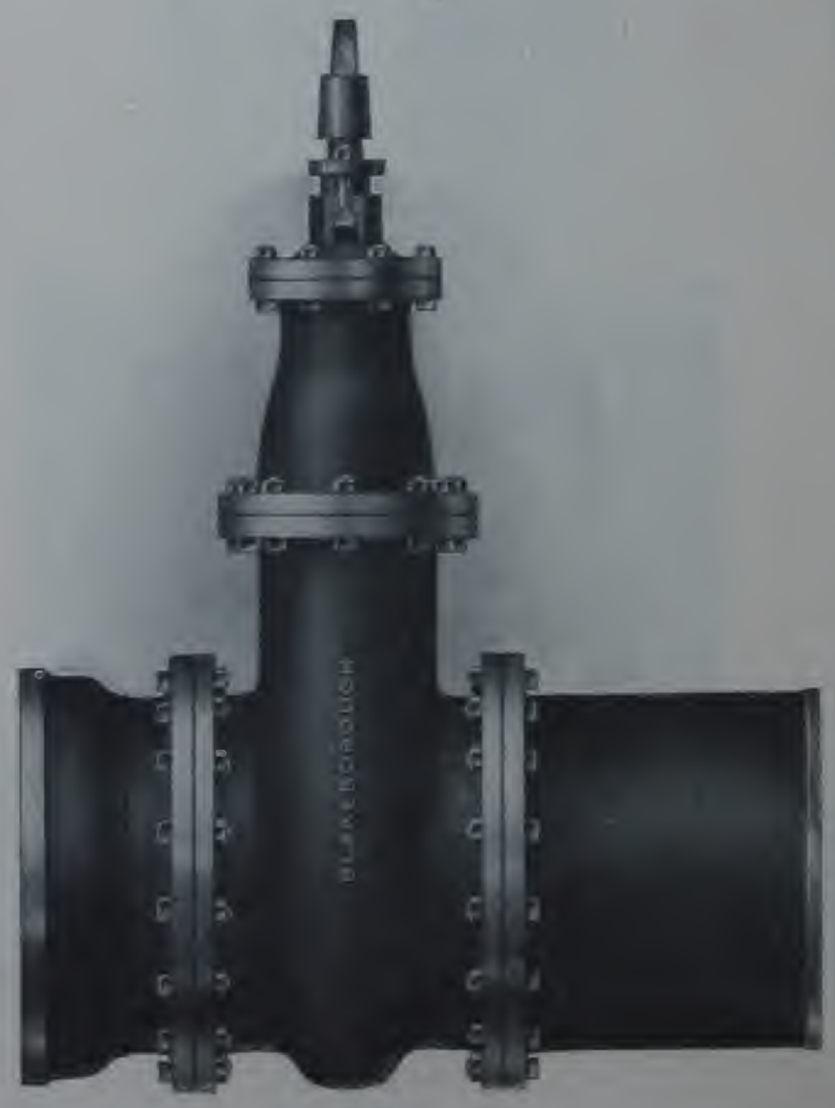


Fig. 2267.

For Heavy Waterworks Pattern, Grade " B " Valves, see page 18.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern **Grade "A"**

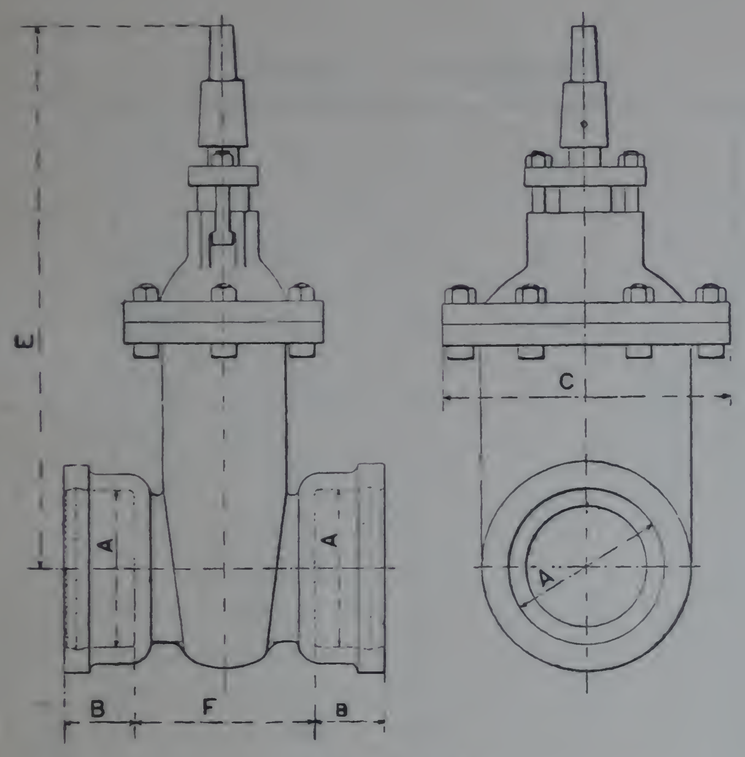


Fig. 2256.

Type up to and including 8 in. Bore.

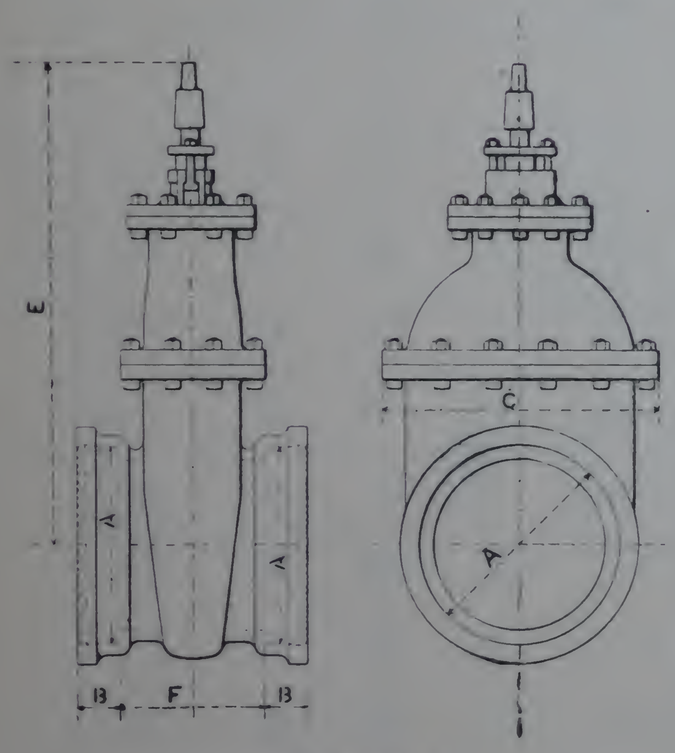


Fig. 2265.

Type for all sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F
2	3·37	$2\frac{3}{4}$	$7\frac{5}{8}$	$16\frac{3}{4}$	$6\frac{1}{4}$
$2\frac{1}{2}$	4·00	$2\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	$6\frac{1}{2}$
3	4·51	3	$9\frac{5}{8}$	$20\frac{1}{4}$	7
4	5·55	3	$11\frac{1}{2}$	$22\frac{1}{2}$	8
5	6·65	$3\frac{1}{2}$	$12\frac{1}{4}$	25	$8\frac{1}{2}$
6	7·73	$3\frac{1}{2}$	$14\frac{1}{4}$	27	9
7	8·81	$3\frac{1}{2}$	$15\frac{7}{8}$	28	$9\frac{1}{2}$
8	9·89	4	$17\frac{3}{8}$	30	10
9	10·95	4	$18\frac{1}{8}$	$33\frac{1}{4}$	$10\frac{1}{2}$
10	12·01	4	19	$34\frac{1}{4}$	11
12	14·35	4	$21\frac{7}{8}$	40	$11\frac{1}{2}$
14	16·47	$4\frac{1}{2}$	$24\frac{3}{4}$	46	$13\frac{1}{2}$
15	17·53	$4\frac{1}{2}$	$25\frac{1}{4}$	46	14
16	18·59	$4\frac{1}{2}$	$27\frac{1}{4}$	48	$14\frac{1}{2}$
18	20·83	$4\frac{1}{2}$	29	$50\frac{3}{4}$	$15\frac{1}{2}$
20	22·93	$4\frac{1}{2}$	$32\frac{1}{4}$	55	$16\frac{1}{2}$
21	23·99	$4\frac{1}{2}$	$35\frac{1}{4}$	59	17
24	27·13	5	$37\frac{3}{4}$	64	20

Prices on Application.

Sockets are in accordance with British Standard Table 4, Report No. 78—1917.

See page 76.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern **Grade "A"**

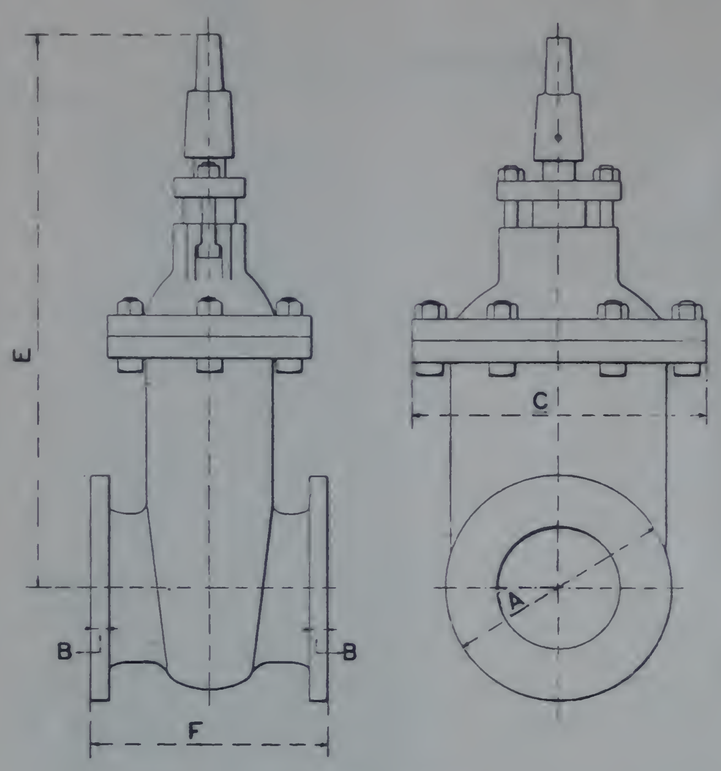


Fig. 2257.
Type up to and including 8 in. Bore.

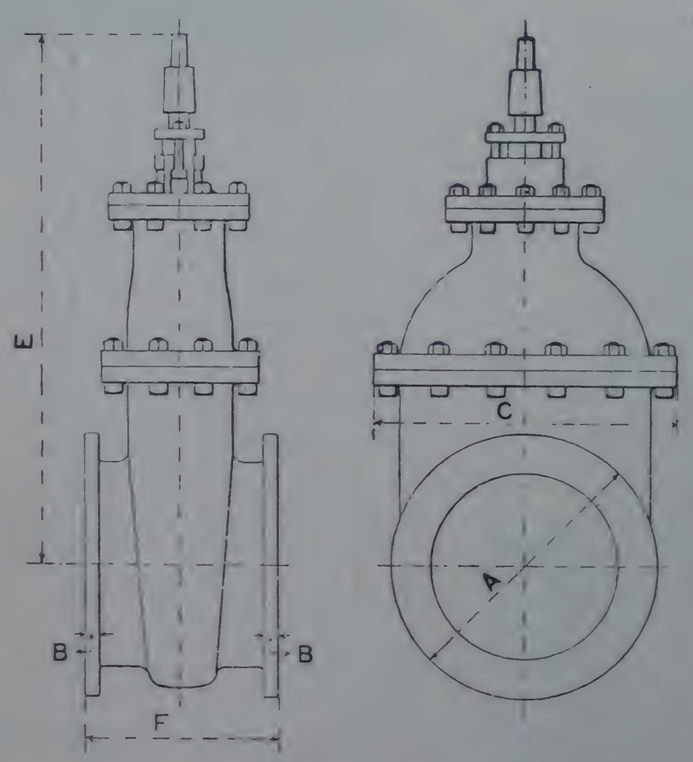


Fig. 2266.
Type for all sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F	
2	6	$\frac{3}{4}$	$7\frac{5}{8}$	$16\frac{3}{4}$	$8\frac{1}{2}$	
$2\frac{1}{2}$	$6\frac{1}{2}$	$\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	$8\frac{1}{2}$	
3	$7\frac{1}{4}$	$\frac{3}{4}$	$9\frac{5}{8}$	$20\frac{1}{4}$	9	
4	$8\frac{1}{2}$	$\frac{7}{8}$	$11\frac{1}{2}$	$22\frac{1}{2}$	$10\frac{1}{2}$	
5	10	$\frac{7}{8}$	$12\frac{1}{4}$	25	11	
6	11	$\frac{7}{8}$	$14\frac{1}{4}$	27	$11\frac{1}{2}$	
7	12	1	$15\frac{7}{8}$	28	12	
8	$13\frac{1}{4}$	1	$17\frac{3}{8}$	30	$12\frac{1}{2}$	
9	$14\frac{1}{2}$	1	$18\frac{1}{8}$	$33\frac{1}{4}$	13	
10	16	1	19	$34\frac{1}{4}$	15	
12	18	$1\frac{1}{8}$	$21\frac{7}{8}$	40	$16\frac{1}{2}$	
14	$20\frac{3}{4}$	$1\frac{1}{4}$	$24\frac{3}{4}$	46	$18\frac{1}{2}$	
15	$21\frac{3}{4}$	$1\frac{1}{4}$	$25\frac{1}{4}$	46	$18\frac{1}{2}$	
16	$22\frac{3}{4}$	$1\frac{1}{4}$	$27\frac{1}{4}$	48	$18\frac{1}{2}$	
18	$25\frac{1}{4}$	$1\frac{3}{8}$	29	$50\frac{3}{4}$	19	
20	$27\frac{3}{4}$	$1\frac{1}{2}$	$32\frac{1}{4}$	55	20	
21	29	$1\frac{1}{2}$	$35\frac{1}{4}$	59	21	
24	$32\frac{1}{2}$	$1\frac{5}{8}$	$37\frac{3}{4}$	64	$23\frac{1}{2}$	

Prices on Application.

Flanges are drilled to British Standard Table 1.

See page 75.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern **Grade "A"**

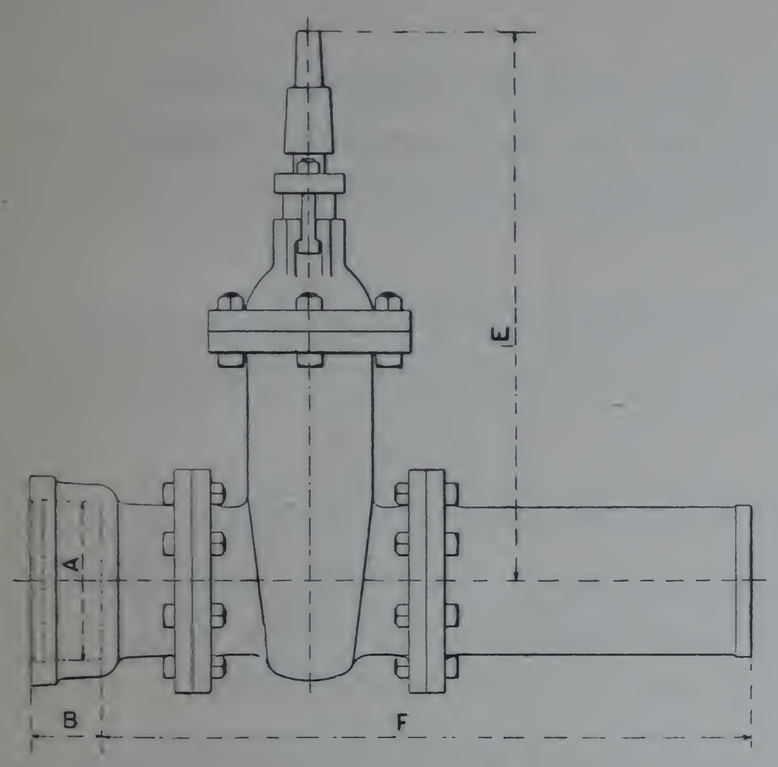


Fig. 2258.
Type up to and including 8 in. Bore.

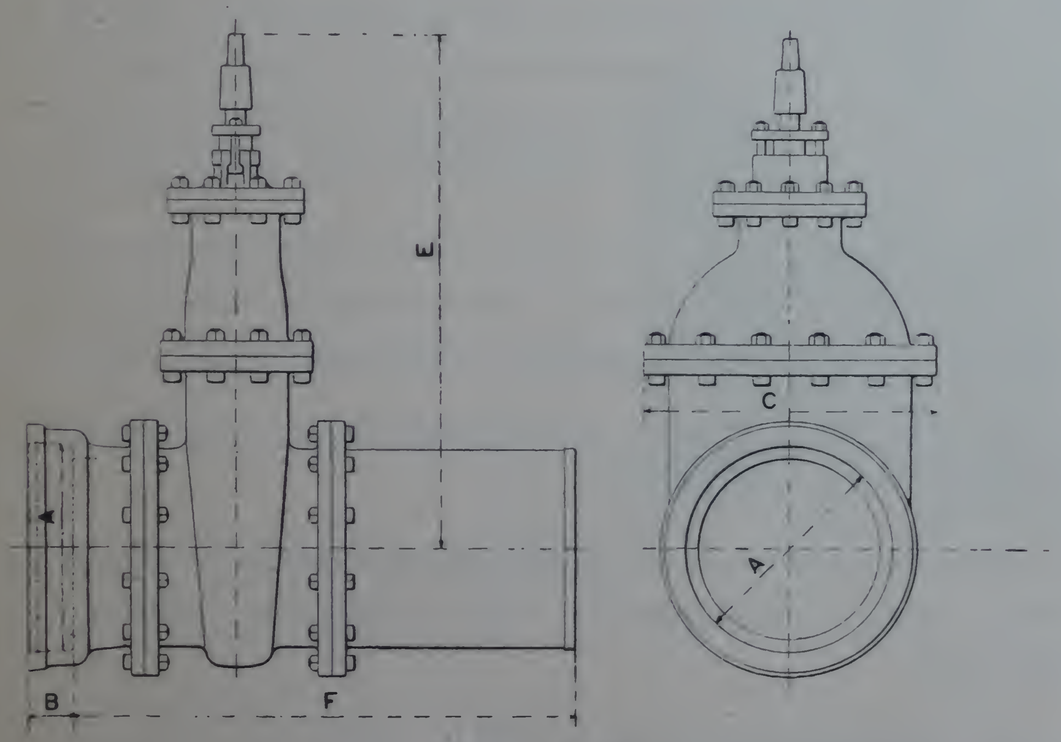


Fig. 2267.
Type for all sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F
2	3·37	$2\frac{3}{4}$	$7\frac{5}{8}$	$16\frac{3}{4}$	28
$2\frac{1}{2}$	4·00	$2\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	28
3	4·51	3	$9\frac{5}{8}$	$20\frac{1}{4}$	$28\frac{1}{4}$
4	5·55	3	$11\frac{1}{2}$	$22\frac{1}{2}$	30
5	6·65	$3\frac{1}{2}$	$12\frac{1}{4}$	25	$30\frac{1}{2}$
6	7·73	$3\frac{1}{2}$	$14\frac{1}{4}$	27	32
7	8·81	$3\frac{1}{2}$	$15\frac{7}{8}$	28	$34\frac{3}{4}$
8	9·89	4	$17\frac{3}{8}$	30	$35\frac{1}{4}$
9	10·95	4	$18\frac{1}{8}$	$33\frac{1}{4}$	$35\frac{3}{4}$
10	12·01	4	19	$34\frac{1}{4}$	38
12	14·35	4	$21\frac{7}{8}$	40	$39\frac{1}{2}$
14	16·47	$4\frac{1}{2}$	$24\frac{3}{4}$	46	$49\frac{1}{4}$
15	17·53	$4\frac{1}{2}$	$25\frac{1}{4}$	46	$49\frac{1}{4}$
16	18·59	$4\frac{1}{2}$	$27\frac{1}{4}$	48	$49\frac{1}{4}$
18	20·83	$4\frac{1}{2}$	29	$50\frac{3}{4}$	$50\frac{1}{4}$
20	22·93	$4\frac{1}{2}$	$32\frac{1}{4}$	55	$51\frac{3}{4}$
21	23·99	$4\frac{1}{2}$	$35\frac{1}{4}$	59	$52\frac{3}{4}$
24	27·13	5	$37\frac{3}{4}$	64	$55\frac{3}{4}$

Prices on Application.

Flanges are drilled to British Standard Table 1. **See page 75.**

Sockets are in accordance with British Standard Table 4, Report No. 78—1917. **See page 76.**

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern **Grade "B"**

Specification

BODY. The Body is of Cast Iron with all Flanges faced right across. The Connecting Flanges are drilled to British Standard Table No. 1. The shape of the Body is elliptical to gain maximum strength, and internal guides are provided to hold the Valve Door in position. Dovetailed recesses are machined in the Body to receive the Gun-metal Faces.

COVER. The Cover is of Cast Iron with Flanges faced right across. For all sizes above 8 in. bore the thrust collar on the Spindle rests upon the machined top Flange of Cover. In the smaller sizes a separate Cast Iron Bridge is provided for this purpose.

STUFFING BOX. The Stuffing Box is of Cast Iron, and is bored to receive the Gland and Spindle.

GLAND. The Gland is of Cast Iron turned outside to fit the Stuffing Box and bored to receive the Spindle, and is attached to the Stuffing Box by two Tee-headed Bolts screwed up by Hexagon Nuts. The word "OPEN" and an arrow indicating the direction of opening are cast in legible characters on top of the Gland.

DOOR. The Door or Plug is of Cast Iron with Dovetailed recesses machined in both sides to receive the Gun-metal Faces. Long Guides are cast on each side to prevent chattering. The Guides extend to the top of the Nut Box, adding increased strength to this important part.

FACES. The Faces are of best selected Hard Gun-metal, machined to correspond to Dovetailed recesses in Body and Door respectively, and forced firmly into position by hydraulic pressure so that they cannot possibly work loose, nor can any leakage take place behind the Faces. Upon final assembling, the Faces are hand scraped to a perfect bearing, which renders the Valve absolutely drop tight under the specified test pressure.

SPINDLE AND NUT. The Spindle is of Solid Forged Bronze, ground all over to a working clearance of ·015 in., and having a machine-cut right-handed square thread of $\frac{1}{2}$ in. pitch. The Gun-metal Nut also has a machine-cut thread to suit Spindle. All Spindles and Nuts are interchangeable in the same size of Valve.

CAP. The Cap is of Cast Iron, fitted on a square formed at top of Spindle, and is secured with a Steel Taper Pin. If desired, a Wrought Iron Cap may be fitted at a little extra charge.

JOINTS AND PACKING. All Body Joints are made of Stout Mill-board. In the case of Valves with Spigot and Socket Ends, the Connecting Flange Joints are made of Gutta-percha. The Stuffing Box is packed with Lubricated Mica Frictionless Packing.

TESTING. All Valves up to and including 12 in. are hydraulically tested to 800 ft. head, and the larger sizes to 600 ft. head, the pressure being applied at both sides of the Door when closed, and to the whole interior of the Valve when the Door is open.

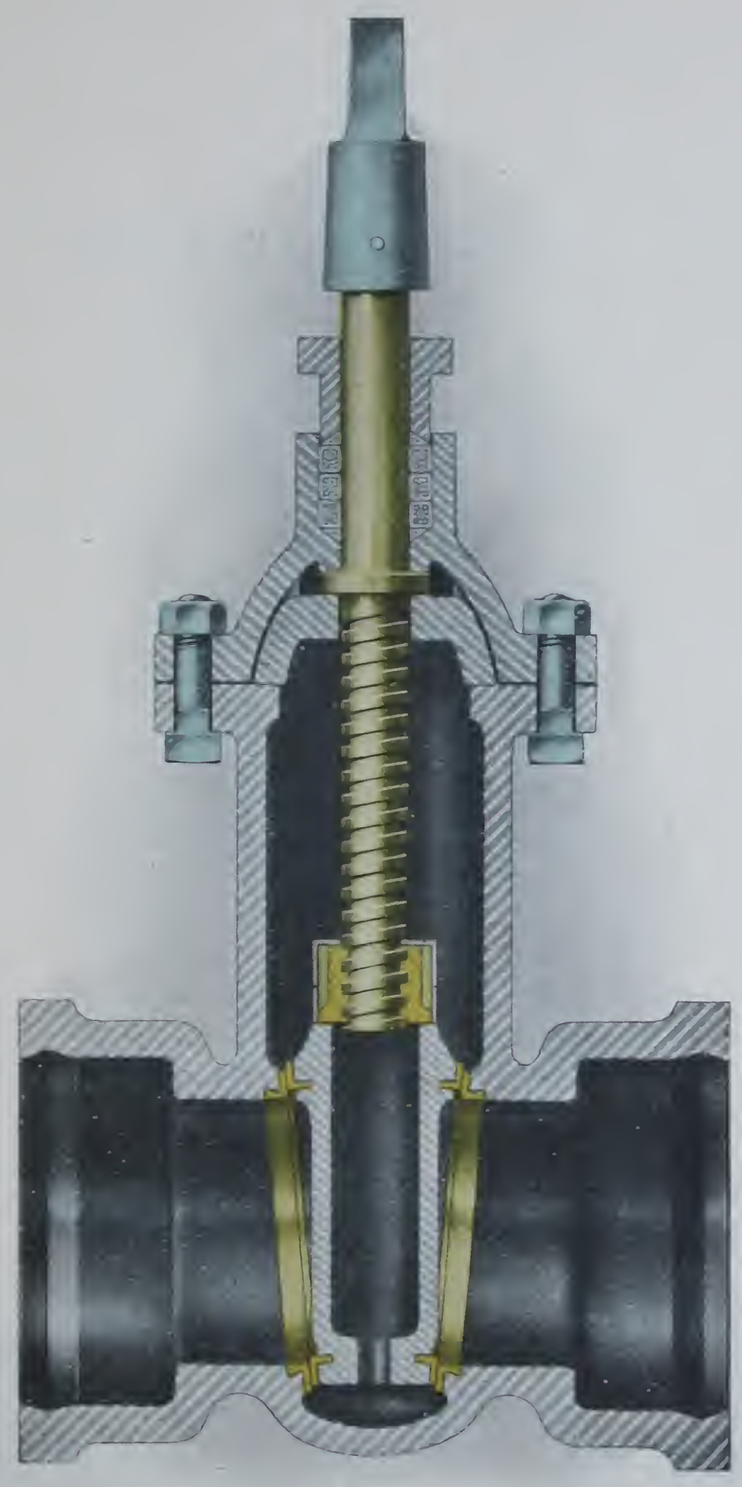
INSPECTION. Valves may be inspected at any time whilst in course of manufacture and on test, every facility being afforded the inspector in his examination. Customers not wishing to witness the tests personally may be provided with certificates of tests if desired.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "B"

Type of Valve for sizes up to and including 8 in. Bore.

Test Pressure—
800 ft. Head.



Working Pressure—
up to 400 ft. Head.

Fig. 2280.

These are identical with the Grade "A" Valves on page 7, with the following exceptions :—

The Bushes in Gland and Stuffing Box are dispensed with.
The Spindle Collar is not Coned.
The Bridge is Cast Iron of Heavy Design.
The Gland Nuts are of Wrought Iron.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "B"

Fig. 2280.

For Schedules of Dimensions
see pages 19 to 21.

Fig. 2281.

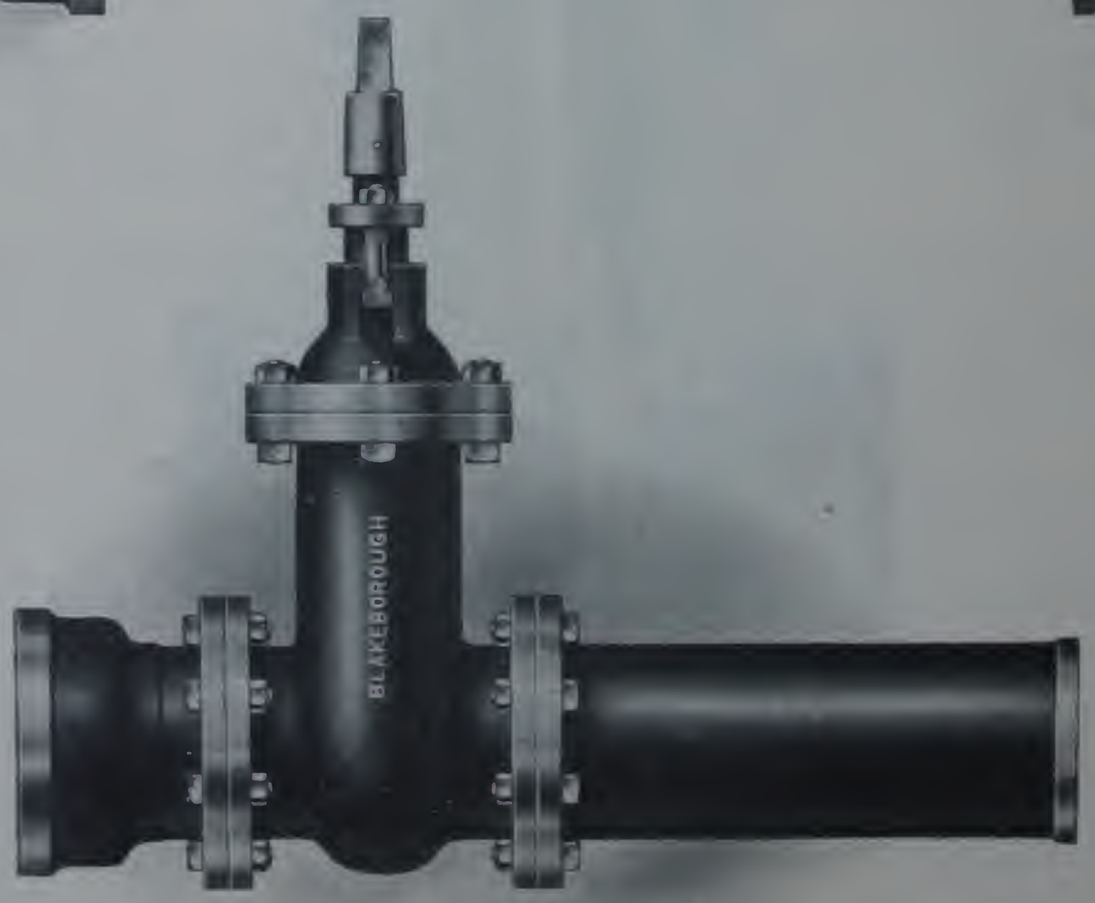


Fig. 2282.

These are identical with the Grade "A" Valves on page 8, with the following exceptions :—

The Bushes in Gland and Stuffing Box are dispensed with.
The Spindle Collar is not Coned.
The Bridge is Cast Iron of Heavy Design. The Gland Nuts are of Wrought Iron.

"Blakeborough" Sluice Valves

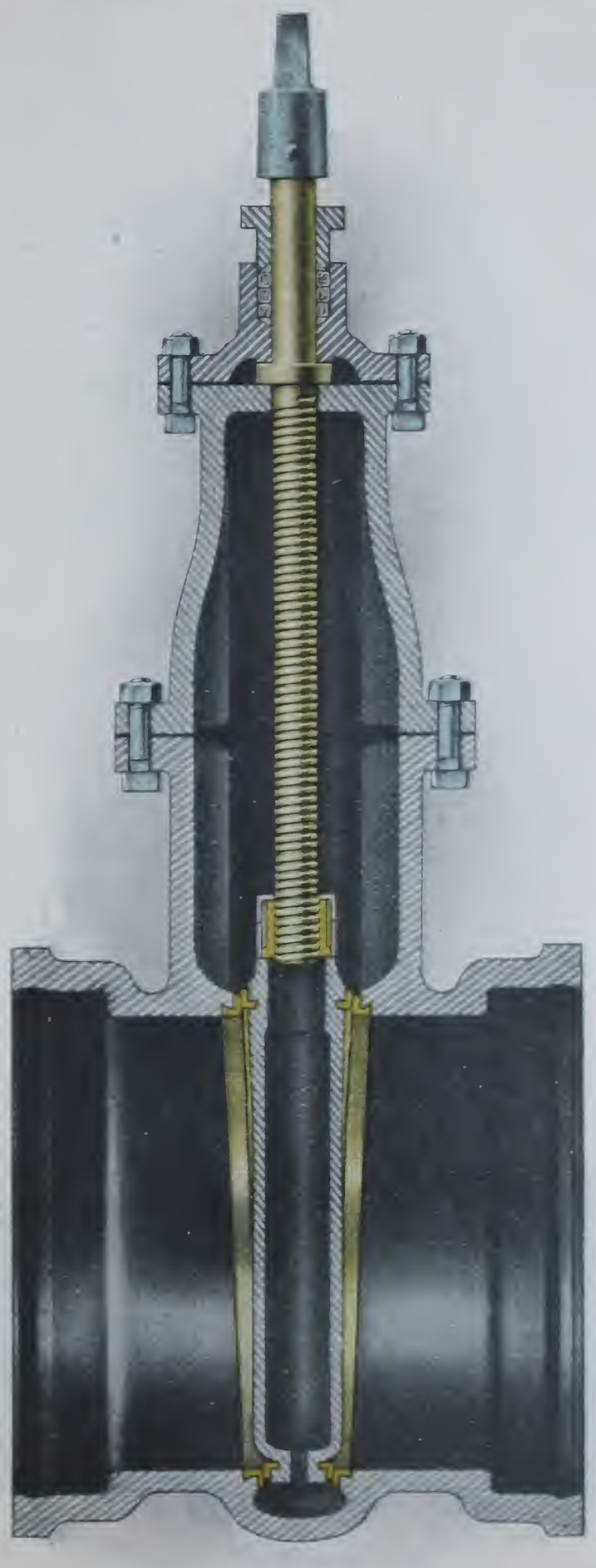
Heavy Waterworks Pattern Grade "B"

Type of Valve for all sizes above 8 in. Bore.

Test Pressures—

Sizes 9 in. to 12 in., 800 ft. Head.

13 in. and upwards, 600 ft. Head.



Working Pressures—

Sizes 9 in. to 12 in., up to 400 ft. Head.

13 in. and upwards, up to 300 ft. Head.

Fig. 2289.

These are identical with the Grade "A" Valves on page 9, with the following exceptions :—
The Bushes in Gland and Stuffing Box, also the Gun-metal Ring under Spindle Collar, are dispensed with.
The Spindle Collar is not Coned. The Gland Nuts are of Wrought Iron.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern **Grade "B"**

For Schedules of Dimensions
see pages 19 to 21.

Fig. 2289.

Fig. 2290.

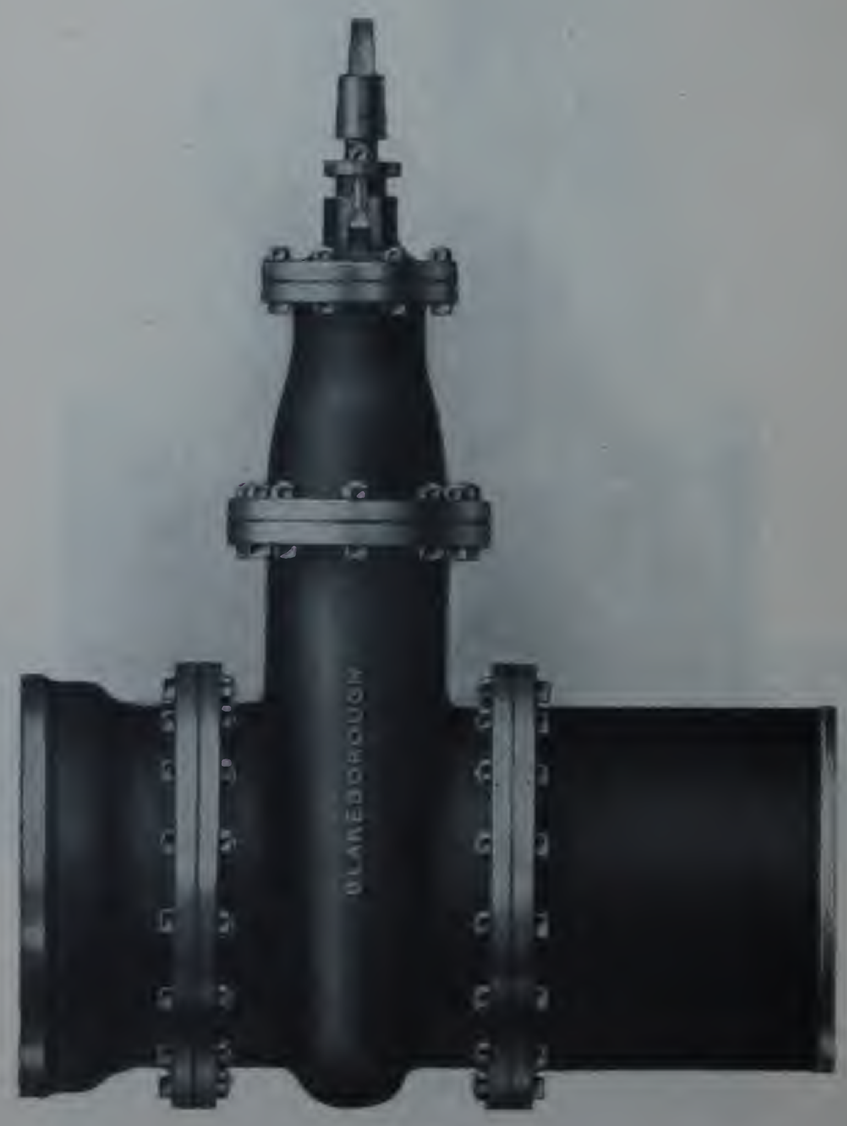


Fig. 2291.

These are identical with the Grade "A" Valves on page 10, with the following exceptions :—
The Bushes in Gland and Stuffing Box, also the Gun-metal Ring under Spindle Collar are dispensed with.
The Spindle Collar is not coned. The Gland Nuts are of Wrought Iron.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "B"

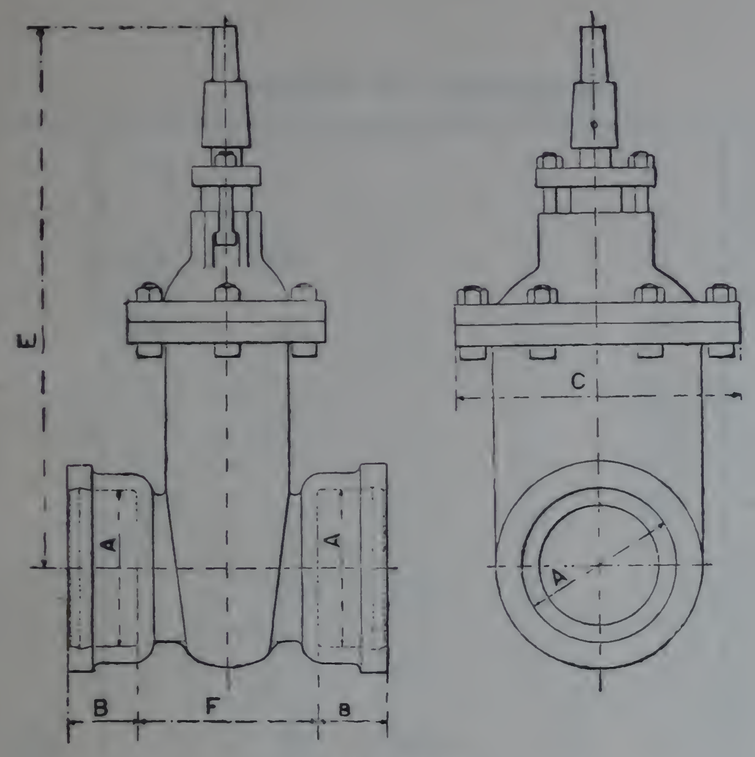


Fig. 2280.

Type up to and including 8 in. Bore.

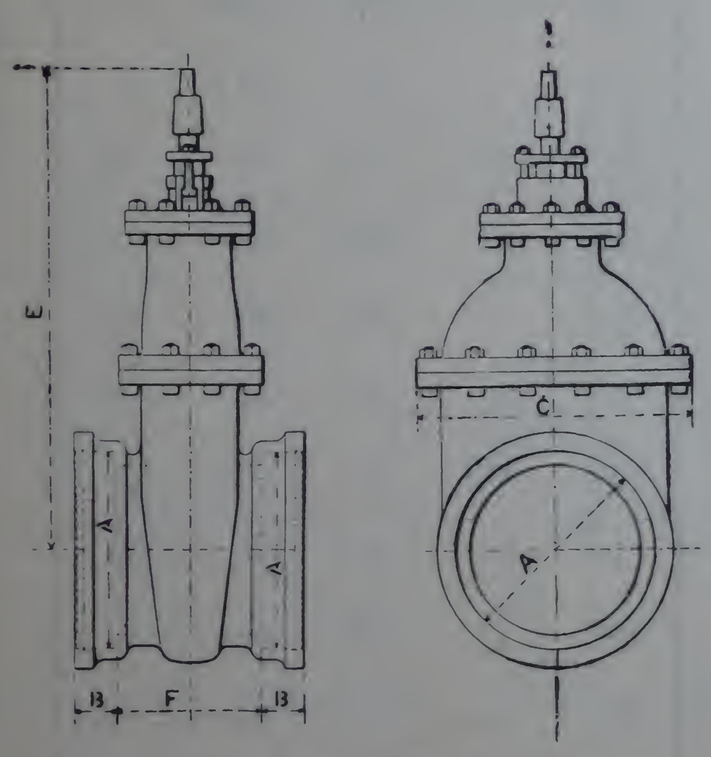


Fig. 2289.

Type for all sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F
2	3·37	$2\frac{3}{4}$	$7\frac{5}{8}$	$16\frac{3}{4}$	$6\frac{1}{4}$
$2\frac{1}{2}$	4·00	$2\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	$6\frac{1}{2}$
3	4·51	3	$9\frac{5}{8}$	$20\frac{1}{4}$	7
4	5·55	3	$11\frac{1}{2}$	$22\frac{1}{2}$	8
5	6·65	$3\frac{1}{2}$	$12\frac{1}{4}$	25	$8\frac{1}{2}$
6	7·73	$3\frac{1}{2}$	$14\frac{1}{4}$	27	9
7	8·81	$3\frac{1}{2}$	$15\frac{7}{8}$	28	$9\frac{1}{2}$
8	9·89	4	$17\frac{3}{8}$	30	10
9	10·95	4	$18\frac{1}{8}$	$33\frac{1}{4}$	$10\frac{1}{2}$
10	12·01	4	19	$34\frac{1}{4}$	11
12	14·35	4	$21\frac{7}{8}$	40	$11\frac{1}{2}$
14	16·47	$4\frac{1}{2}$	$24\frac{3}{4}$	46	$13\frac{1}{2}$
15	17·53	$4\frac{1}{2}$	$25\frac{1}{4}$	46	14
16	18·59	$4\frac{1}{2}$	$27\frac{1}{4}$	48	$14\frac{1}{2}$
18	20·83	$4\frac{1}{2}$	29	$50\frac{3}{4}$	$15\frac{1}{2}$
20	22·93	$4\frac{1}{2}$	$32\frac{1}{4}$	55	$16\frac{1}{2}$
21	23·99	$4\frac{1}{2}$	$35\frac{1}{4}$	59	17
24	27·13	5	$37\frac{3}{4}$	64	20

Prices on Application.

Sockets are in accordance with British Standard Table 4, Report No. 78—1917.

See page 76.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern Grade "B"

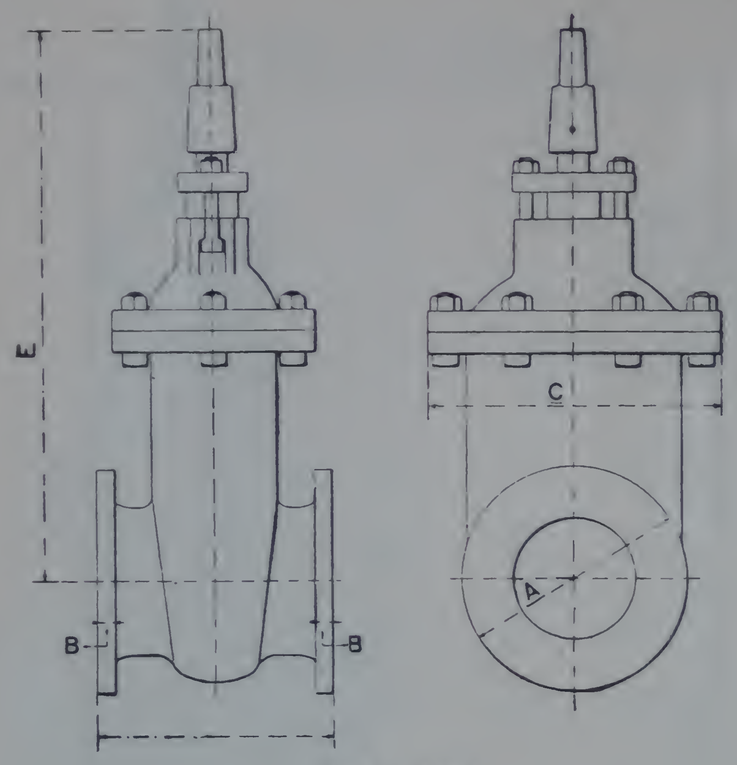


Fig. 2281.

Type up to and including 8 in. Bore.

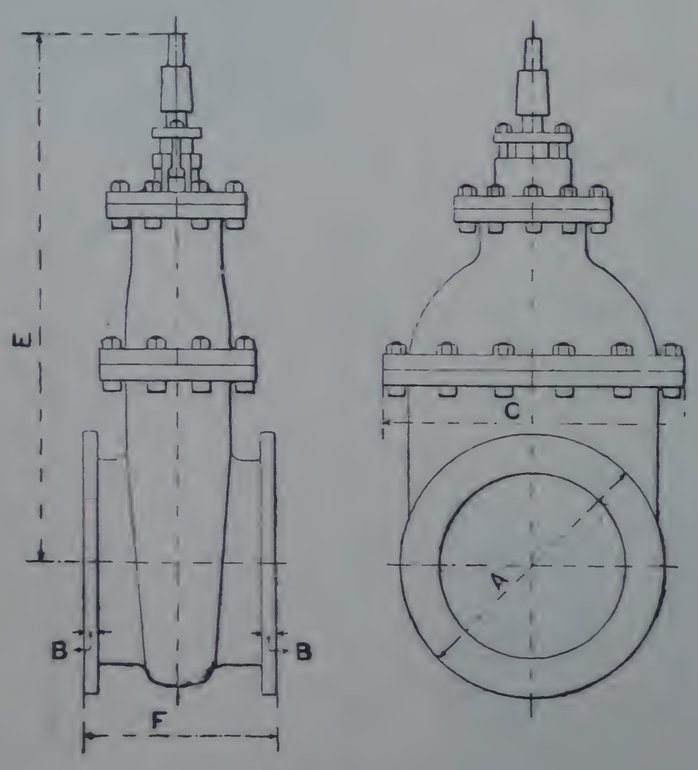


Fig. 2290.

Type for all sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F
2	6	$\frac{3}{4}$	$7\frac{5}{8}$	$16\frac{3}{4}$	$8\frac{1}{2}$
$2\frac{1}{2}$	$6\frac{1}{2}$	$\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	$8\frac{1}{2}$
3	$7\frac{1}{4}$	$\frac{3}{4}$	$9\frac{5}{8}$	$20\frac{1}{4}$	9
4	$8\frac{1}{2}$	$\frac{7}{8}$	$11\frac{1}{2}$	$22\frac{1}{2}$	$10\frac{1}{2}$
5	10	$\frac{7}{8}$	$12\frac{1}{4}$	25	11
6	11	$\frac{7}{8}$	$14\frac{1}{4}$	27	$11\frac{1}{2}$
7	12	1	$15\frac{7}{8}$	28	12
8	$13\frac{1}{4}$	1	$17\frac{3}{8}$	30	$12\frac{1}{2}$
9	$14\frac{1}{2}$	1	$18\frac{1}{8}$	$33\frac{1}{4}$	13
10	16	1	19	$34\frac{1}{4}$	15
12	18	$1\frac{1}{8}$	$21\frac{7}{8}$	40	$16\frac{1}{2}$
14	$20\frac{3}{4}$	$1\frac{1}{4}$	$24\frac{3}{4}$	46	$18\frac{1}{2}$
15	$21\frac{3}{4}$	$1\frac{1}{4}$	$25\frac{1}{4}$	46	$18\frac{1}{2}$
16	$22\frac{3}{4}$	$1\frac{1}{4}$	$27\frac{1}{4}$	48	$18\frac{1}{2}$
18	$25\frac{1}{4}$	$1\frac{3}{8}$	29	$50\frac{3}{4}$	19
20	$27\frac{3}{4}$	$1\frac{1}{2}$	$32\frac{1}{4}$	55	20
21	29	$1\frac{1}{2}$	$35\frac{1}{4}$	59	21
24	$32\frac{1}{2}$	$1\frac{5}{8}$	$37\frac{3}{4}$	64	$23\frac{1}{2}$

Prices on Application.

Flanges are drilled to British Standard Table 1.

See page 75.

"Blakeborough" Sluice Valves

Heavy Waterworks Pattern **Grade "B"**

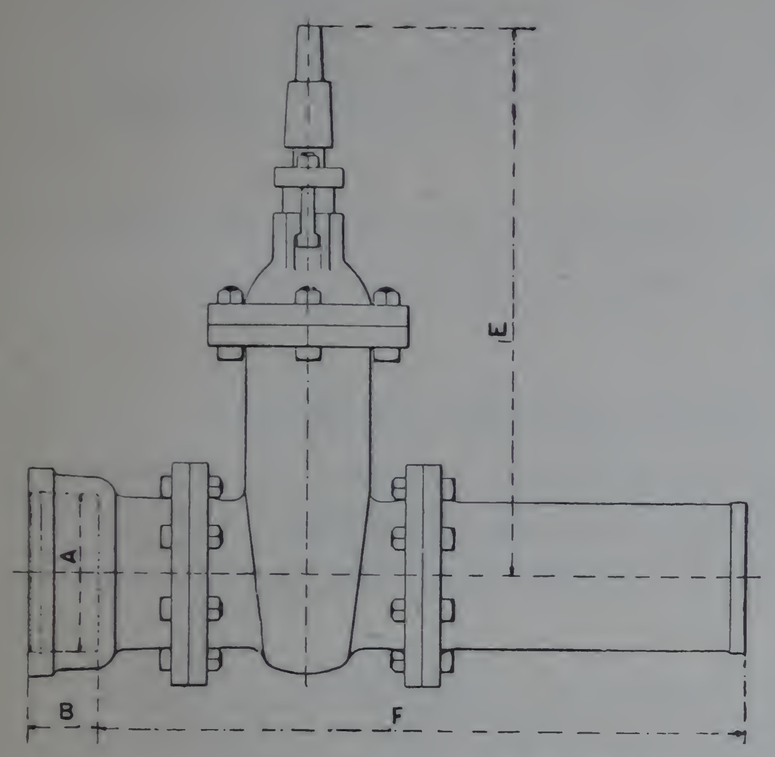


Fig. 2282.

Type up to and including 8 in. Bore.

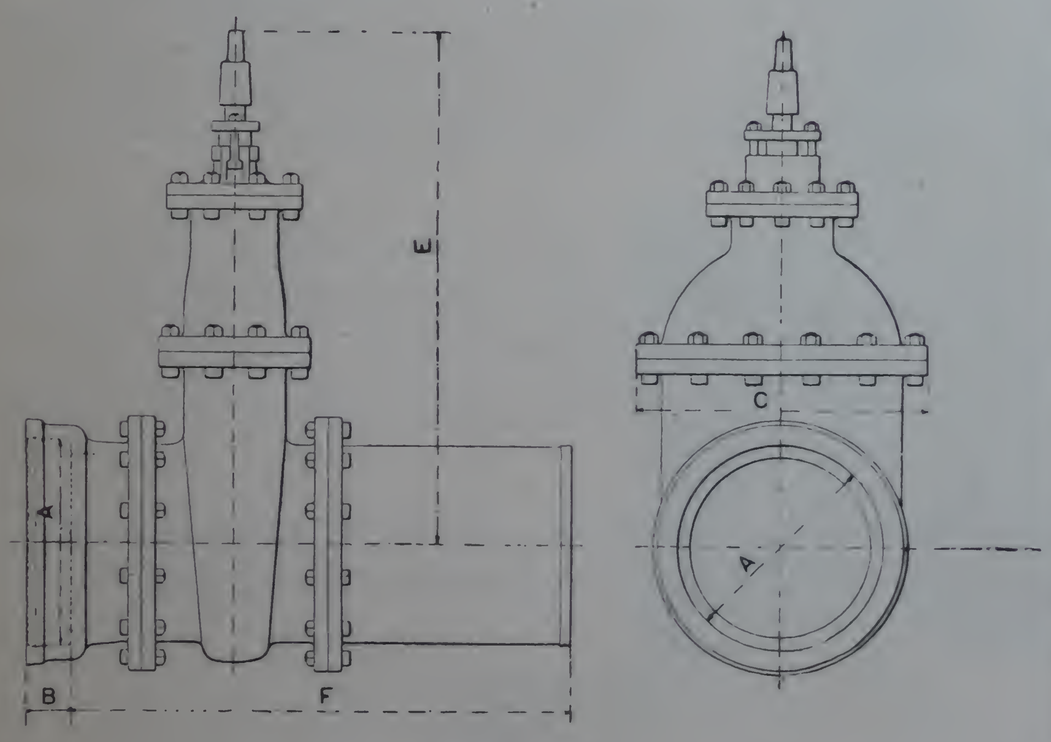


Fig. 2291.

Type for all sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F
2	3·37	$2\frac{3}{4}$	$7\frac{5}{8}$	$16\frac{3}{4}$	28
$2\frac{1}{2}$	4·00	$2\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	28
3	4·51	3	$9\frac{5}{8}$	$20\frac{1}{4}$	$28\frac{1}{4}$
4	5·55	3	$11\frac{1}{2}$	$22\frac{1}{2}$	30
5	6·65	$3\frac{1}{2}$	$12\frac{1}{4}$	25	$30\frac{1}{2}$
6	7·73	$3\frac{1}{2}$	$14\frac{1}{4}$	27	32
7	8·81	$3\frac{1}{2}$	$15\frac{7}{8}$	28	$34\frac{3}{4}$
8	9·89	4	$17\frac{3}{8}$	30	$35\frac{1}{4}$
9	10·95	4	$18\frac{1}{8}$	$33\frac{1}{4}$	$35\frac{3}{4}$
10	12·01	4	19	$34\frac{1}{4}$	38
12	14·35	4	$21\frac{7}{8}$	40	$39\frac{1}{2}$
14	16·47	$4\frac{1}{2}$	$24\frac{3}{4}$	46	$49\frac{1}{4}$
15	17·53	$4\frac{1}{2}$	$25\frac{1}{4}$	46	$49\frac{1}{4}$
16	18·59	$4\frac{1}{2}$	$27\frac{1}{4}$	48	$49\frac{1}{4}$
18	20·83	$4\frac{1}{2}$	29	$50\frac{3}{4}$	$50\frac{1}{4}$
20	22·93	$4\frac{1}{2}$	$32\frac{1}{4}$	55	$51\frac{3}{4}$
21	23·99	$4\frac{1}{2}$	$35\frac{1}{4}$	59	$52\frac{3}{4}$
24	27·13	5	$37\frac{3}{4}$	64	$55\frac{3}{4}$

Prices on Application.

Flanges are drilled to British Standard Table 1. See page 75.

Sockets are in accordance with British Standard Table 4. Report No. 78—1917. See page 76.

"Blakeborough" Sluice Valves

Medium Pattern

Specification

BODY. The Body is of Cast Iron with all Flanges faced right across. The Connecting Flanges of Valves up to 24 in. bore are drilled to British Standard Table No. 1. The shape of the Body is elliptical to gain maximum strength, and internal guides are provided to hold the Valve Door in position. Dovetailed recesses are machined in the Body to receive the Gun-metal Faces.

COVER. The Cover is of Cast Iron with Flanges faced right across. For all sizes above 8 in. bore the Thrust Collar on the Spindle rests upon the machined top Flange of Cover. In the smaller sizes a separate Cast Iron Bridge is provided for this purpose.

STUFFING BOX. The Stuffing Box is of Cast Iron, and is bored to receive the Gland and Spindle.

GLAND. The Gland is of Cast Iron turned outside to fit the Stuffing Box, and bored to receive the Spindle, and is attached to the Stuffing Box by two Tee-headed Bolts screwed up by Hexagon Nuts. The word "OPEN" and an arrow indicating the direction of opening are cast in legible characters on top of the Gland.

DOOR. The Door or Plug is of Cast Iron with Dovetailed recesses machined in both sides to receive the Gun-metal Faces. Long Guides are cast on each side to prevent chattering. A Nut Box is also cast on top of Door into which the Gun-metal Nut is carefully fitted.

FACES. The Faces are of best selected Hard Gun-metal, machined to correspond to Dovetailed recesses in Body and Door respectively, and forced firmly into position by hydraulic pressure so that they cannot possibly work loose, nor can any leakage take place behind the Faces. Upon final assembling, the Faces are hand scraped to a perfect bearing, which renders the Valve absolutely drop tight under the specified test pressure.

SPINDLE AND NUT. The Spindle is of Solid Forged Bronze, ground all over to a working clearance of ·015 in., and having a right-handed machine-cut Square Thread of ½ in. pitch. The Gun-metal Nut also has a machine-cut Thread to suit Spindle. All Spindles and Nuts are interchangeable in the same size of Valve.

CAP. The Cap is of Cast Iron, fitted on a square formed at top of Spindle, and is secured with a Steel Taper Pin.

JOINTS AND PACKING. All Body Joints are made of stout Mill-board. In the case of Valves with Spigot and Socket Ends, the connecting Flange Joints are made of Gutta-percha. The Stuffing Box is packed with Lubricated Mica Frictionless Packing.

TESTING. All Valves up to and including 12 in. are hydraulically tested to 600 ft. head.

" " " " " 13 in. to 24 in. " " 400 ft. "

The pressure is applied at both sides of the Door when closed, and to the whole interior of the Valve when the Door is open.

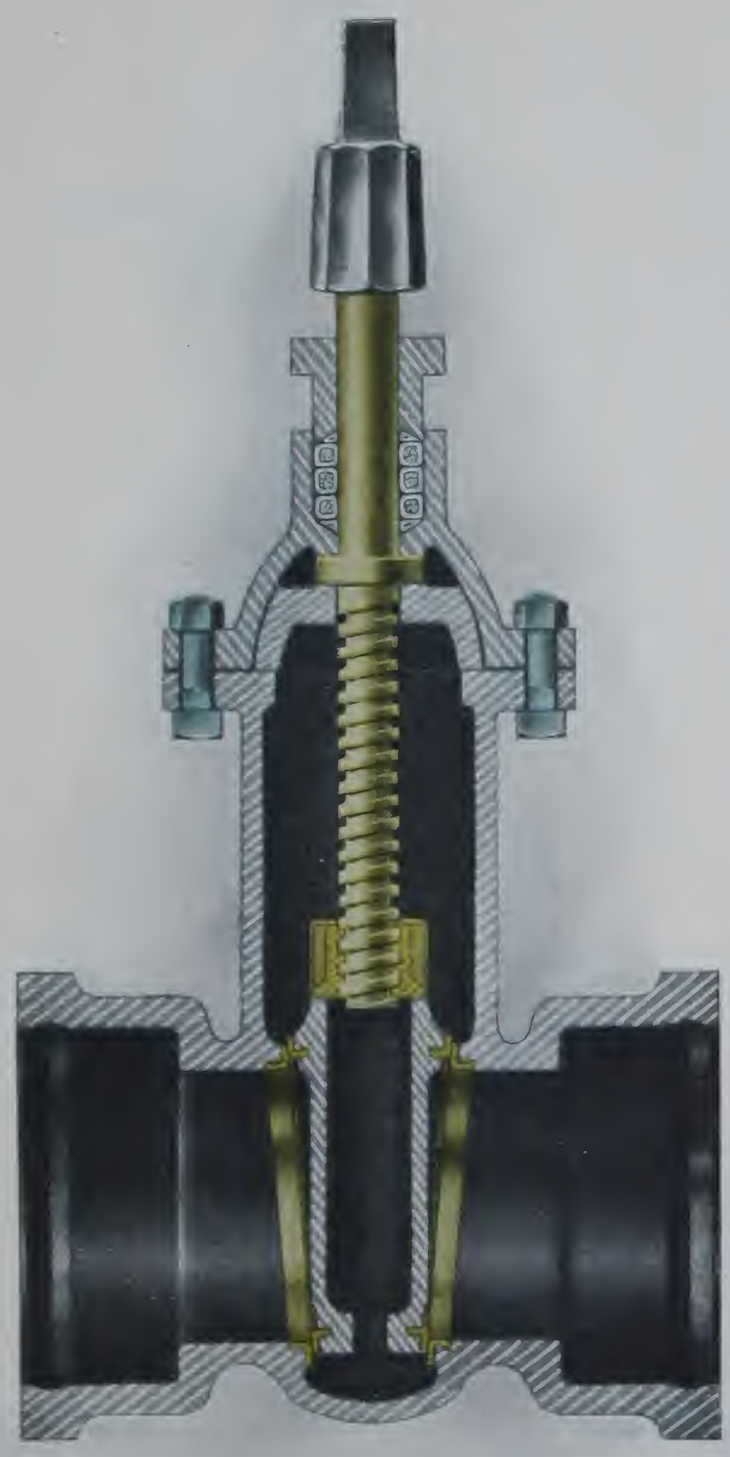
INSPECTION. Valves may be inspected at any time whilst in course of manufacture and on test, every facility being afforded the inspector in his examination. Customers not wishing to witness the tests personally may be provided with certificates of tests of desired.

"Blakeborough" Sluice Valves

Medium Pattern

Type of Valve for sizes up to and including 8 in. Bore.

Test Pressure—
600 ft. Head.



Working Pressure—
up to 300 ft. Head.

Fig. 2304.

For Schedules of Dimensions see pages 27 to 29.
For Heavy Pattern Valves see pages 7 and 15.

"Blakeborough" Sluice Valves

Medium Pattern

Fig. 2304.

For Schedules of Dimensions
see pages 27 to 29.

Fig. 2305.

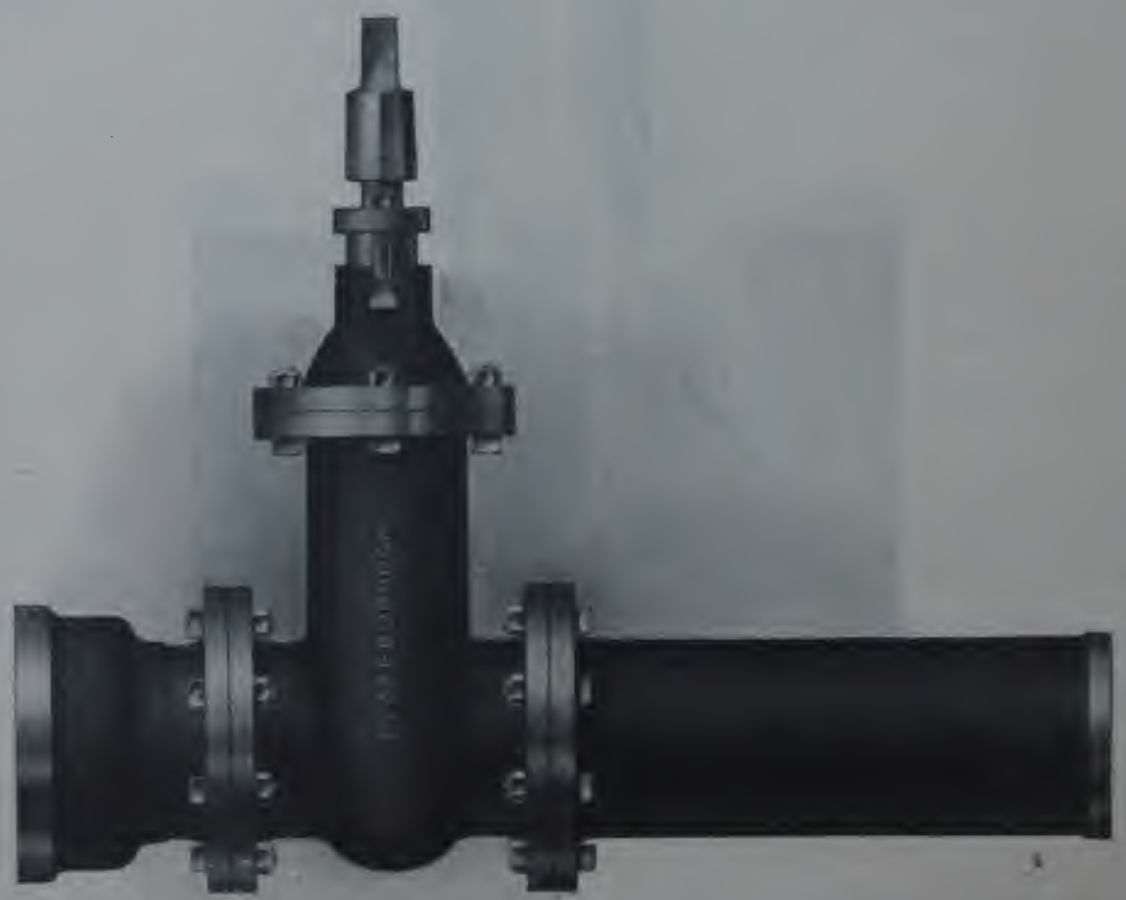


Fig. 2306.

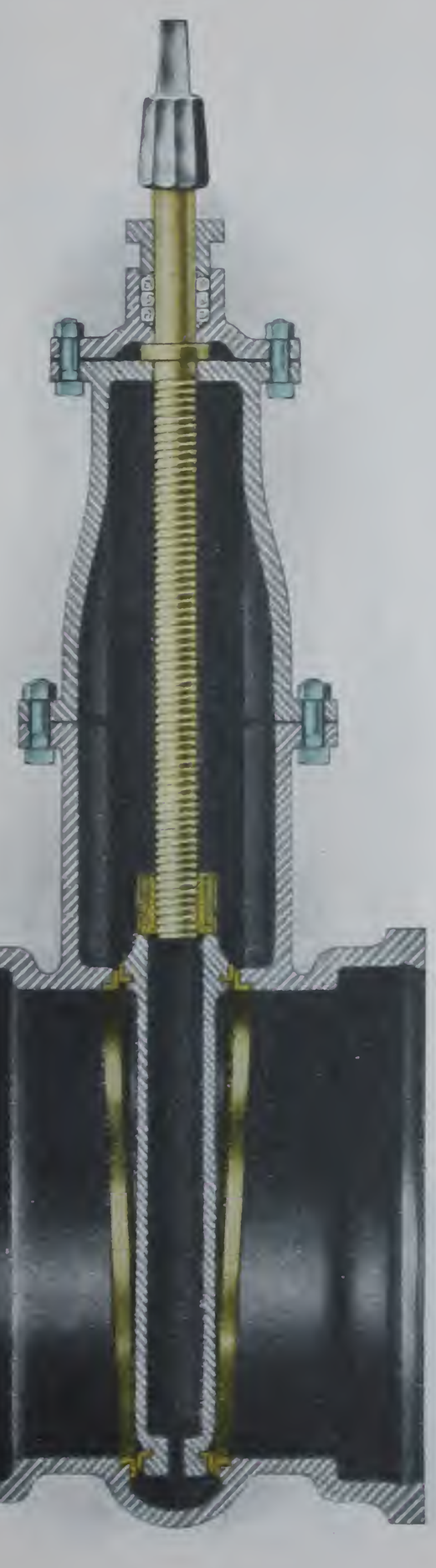
For Heavy Valves see pages 8 and 16.

"Blakeborough" Sluice Valves

Medium Pattern

Type of Valve for all sizes above 8 in. Bore.

Test Pressures—
Sizes 9 in. to 12 in., 600 ft. Head.
Sizes 13 in. to 24 in., 400 ft. Head.



Working Pressures—
Sizes 9 in. to 12 in., up to 300 ft. Head.
Sizes 13 in. to 24 in., up to 200 ft. Head.

Fig. 2313.

For Schedules of Dimensions see page 27 to 29.

For Heavy Pattern Valves see pages 9 and 17.

"Blakeborough" Sluice Valves

Medium Pattern

For Schedules of Dimensions
see pages 27 to 29.

Fig. 2313.

Fig. 2314

Fig. 2315.

For Heavy Valves see pages 10 and 18.

"Blakeborough" Sluice Valves

Medium Pattern

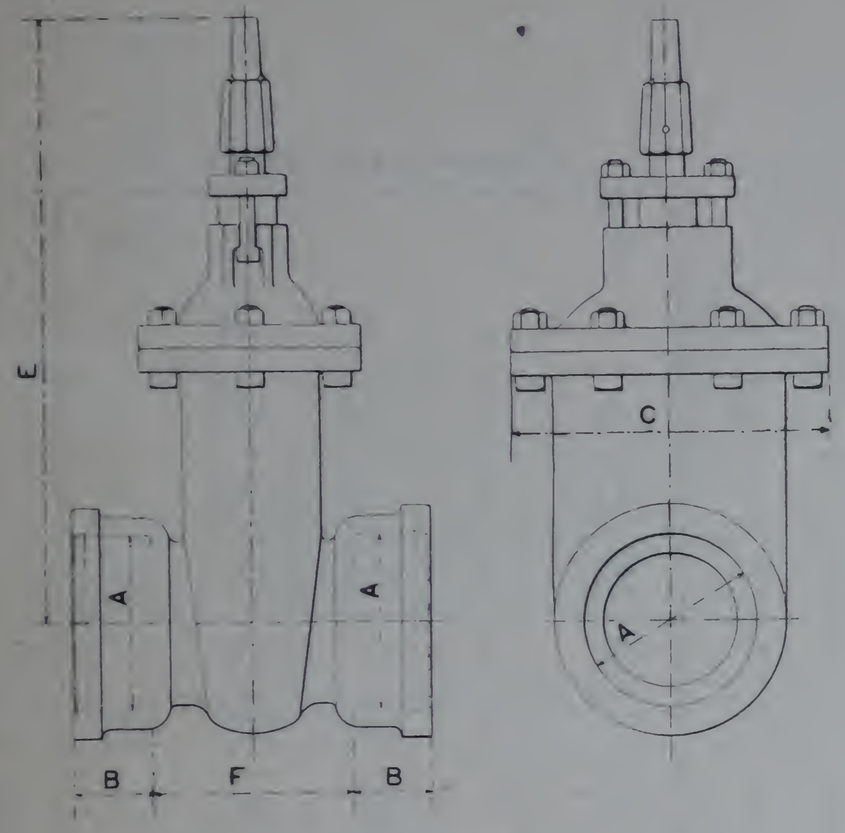


Fig. 2304.

Type up to and including 8 in. Bore.

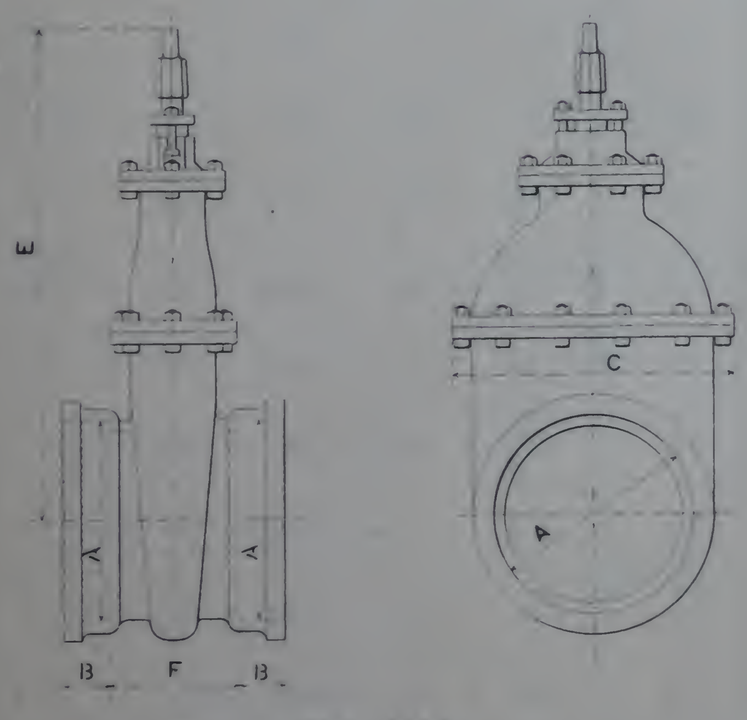


Fig. 2313.

Type for all sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F
2	3·37	$2\frac{3}{4}$	7	$16\frac{3}{4}$	6
$2\frac{1}{2}$	4·00	$2\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	$6\frac{1}{2}$
3	4·51	3	$8\frac{7}{8}$	$18\frac{1}{4}$	$6\frac{1}{2}$
4	5·55	3	$10\frac{1}{2}$	22	$7\frac{1}{2}$
5	6·65	$3\frac{1}{2}$	12	$23\frac{1}{2}$	8
6	7·73	$3\frac{1}{2}$	$13\frac{3}{8}$	$26\frac{1}{4}$	$8\frac{1}{2}$
7	8·81	$3\frac{1}{2}$	15	$28\frac{1}{4}$	9
8	9·89	4	$16\frac{1}{8}$	$29\frac{1}{2}$	$9\frac{1}{2}$
9	10·95	4	$16\frac{1}{8}$	$31\frac{1}{2}$	10
10	12·01	4	18	33	10
12	14·35	4	21	38	$10\frac{1}{2}$
14	15·97	$4\frac{1}{2}$	$22\frac{5}{8}$	41	$10\frac{1}{2}$
15	17·01	$4\frac{1}{2}$	$23\frac{1}{2}$	42	11
16	18·05	$4\frac{1}{2}$	$26\frac{1}{4}$	44	$11\frac{1}{2}$
18	20·25	$4\frac{1}{2}$	28	49	$13\frac{1}{2}$
20	22·33	$4\frac{1}{2}$	$32\frac{1}{2}$	54	$15\frac{1}{2}$
21	23·37	$4\frac{1}{2}$	$32\frac{1}{2}$	54	$15\frac{1}{2}$
24	26·47	5	35	61	17

Prices on Application.

Sockets are in accordance with British Standard Table 4. Report No. 78—1917.

See page 76.

"Blakeborough" Sluice Valves

Medium Pattern

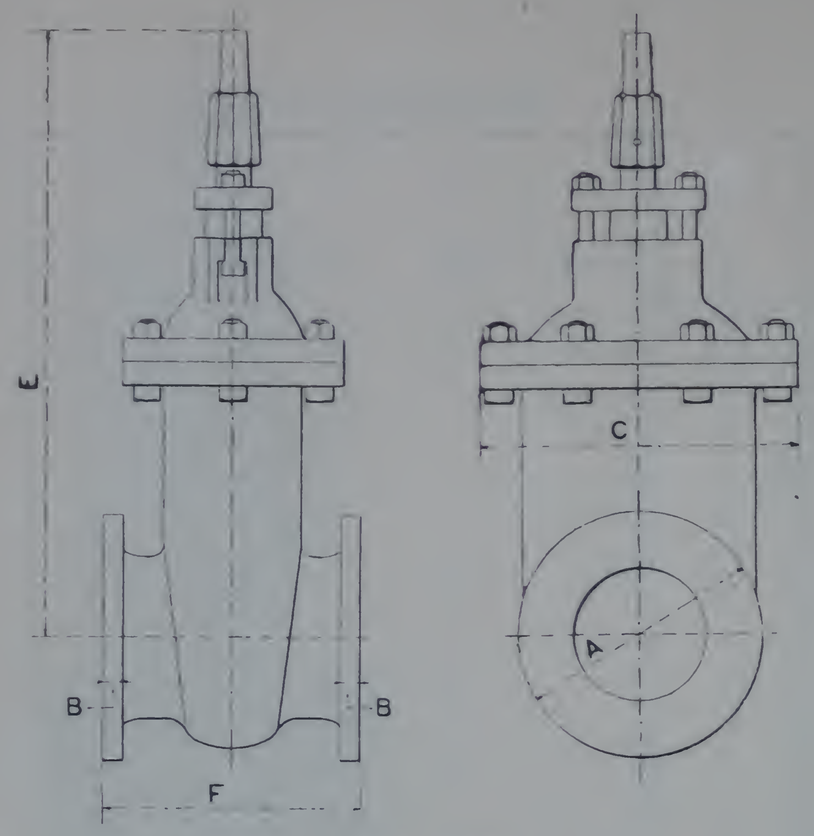


Fig. 2305.

Type up to and including 8 in. Bore.

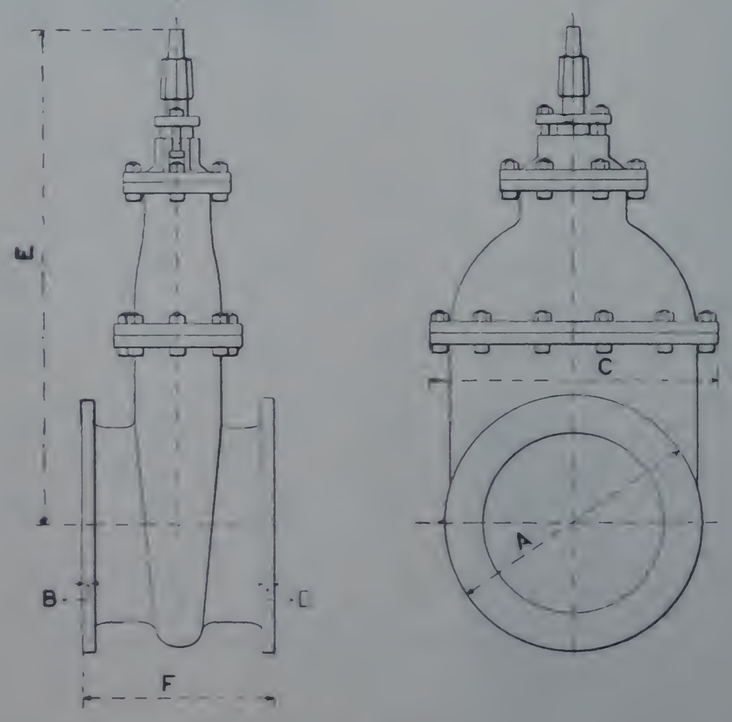


Fig. 2314.

Type for all sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F
2	6	$\frac{3}{4}$	7	$16\frac{3}{4}$	$8\frac{1}{2}$
$2\frac{1}{2}$	$6\frac{1}{2}$	$\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	$8\frac{1}{2}$
3	$7\frac{1}{4}$	$\frac{3}{4}$	$8\frac{7}{8}$	$18\frac{1}{4}$	9
4	$8\frac{1}{2}$	$\frac{7}{8}$	$10\frac{1}{2}$	22	$10\frac{1}{2}$
5	10	$\frac{7}{8}$	12	$23\frac{1}{2}$	11
6	11	$\frac{7}{8}$	$13\frac{3}{8}$	$26\frac{1}{4}$	$11\frac{1}{2}$
7	12	1	15	$28\frac{1}{4}$	12
8	$13\frac{1}{4}$	1	$16\frac{1}{8}$	$29\frac{1}{2}$	$12\frac{1}{2}$
9	$14\frac{1}{2}$	1	$16\frac{1}{8}$	$31\frac{1}{2}$	13
10	16	1	18	33	15
12	18	$1\frac{1}{8}$	21	38	$16\frac{1}{2}$
14	$20\frac{3}{4}$	$1\frac{1}{4}$	$22\frac{5}{8}$	41	$18\frac{1}{2}$
15	$21\frac{3}{4}$	$1\frac{1}{4}$	$23\frac{1}{2}$	42	$18\frac{1}{2}$
16	$22\frac{3}{4}$	$1\frac{1}{4}$	$26\frac{1}{4}$	44	$18\frac{1}{2}$
18	$25\frac{1}{4}$	$1\frac{3}{8}$	28	49	19
20	$27\frac{3}{4}$	$1\frac{1}{2}$	$32\frac{1}{2}$	54	20
21	29	$1\frac{1}{2}$	$32\frac{1}{2}$	54	21
24	$32\frac{1}{2}$	$1\frac{5}{8}$	35	61	$23\frac{1}{2}$

Prices on Application.

Flanges are drilled to British Standard Table 1.

See page 75.

"Blakeborough" Sluice Valves

Medium Pattern

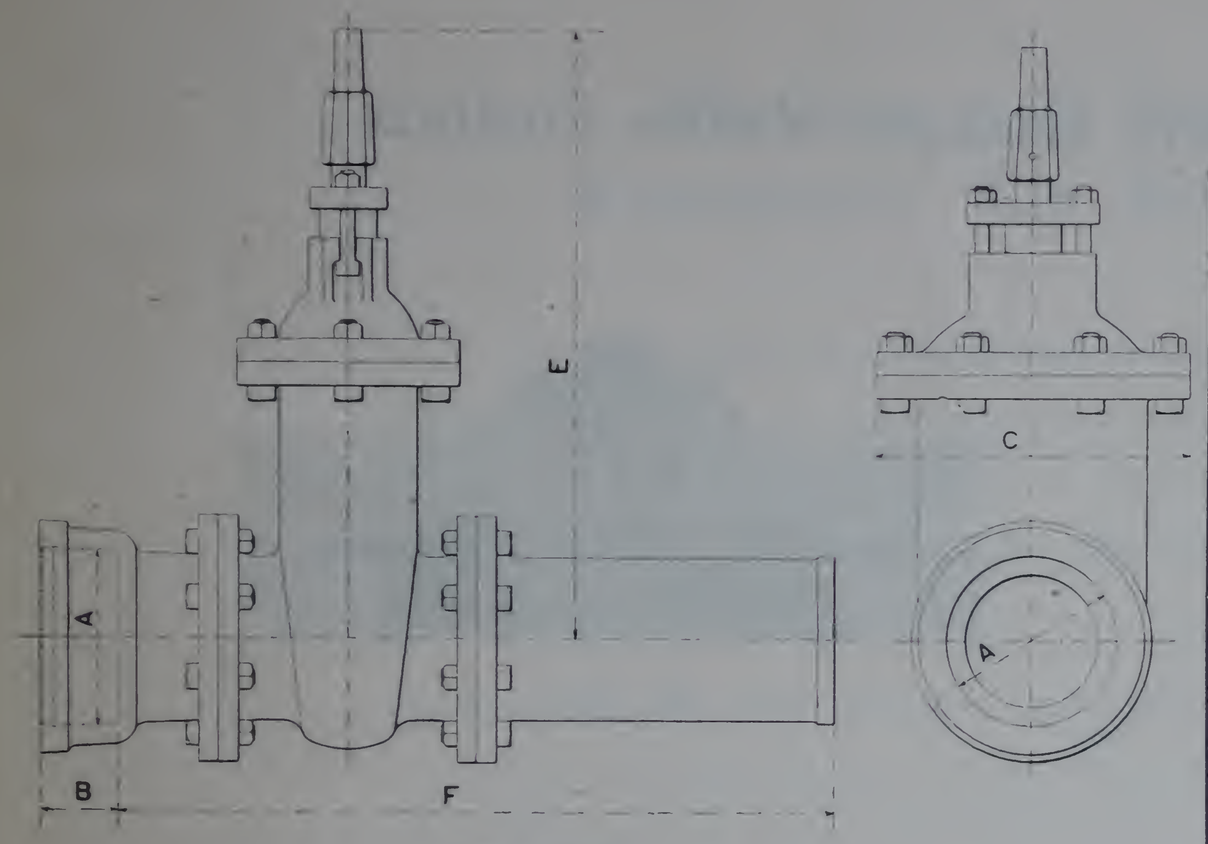


Fig. 2306.

Type for all sizes up to 8 in. Bore.

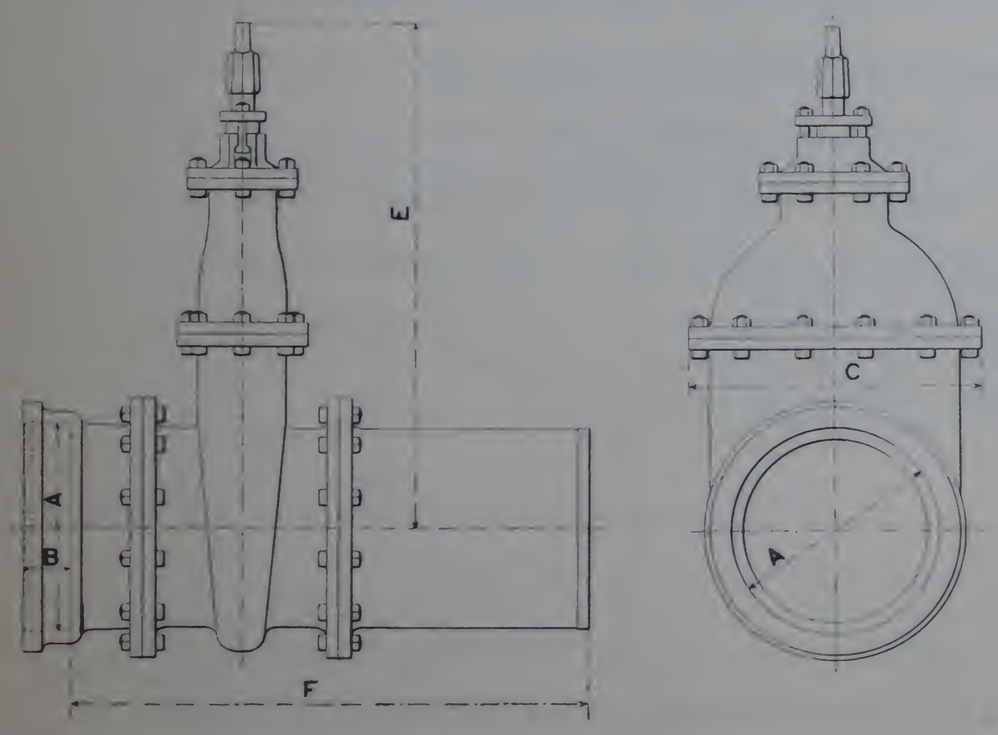


Fig. 2315.

Type for sizes above 8 in. Bore.

Dimensions in Inches.

Size	A	B	C	E	F
2	3·37	$2\frac{3}{4}$	7	$16\frac{3}{4}$	28
$2\frac{1}{2}$	4·00	$2\frac{3}{4}$	$8\frac{1}{4}$	$17\frac{1}{4}$	28
3	4·51	3	$8\frac{7}{8}$	$18\frac{1}{4}$	$28\frac{1}{4}$
4	5·55	3	$10\frac{1}{2}$	22	30
5	6·65	$3\frac{1}{2}$	12	$23\frac{1}{2}$	$30\frac{1}{2}$
6	7·73	$3\frac{1}{2}$	$13\frac{3}{8}$	$26\frac{1}{4}$	32
7	8·81	$3\frac{1}{2}$	15	$28\frac{1}{4}$	$34\frac{3}{4}$
8	9·89	4	$16\frac{1}{8}$	$29\frac{1}{2}$	$35\frac{1}{4}$
9	10·95	4	$16\frac{1}{8}$	$31\frac{1}{2}$	$35\frac{3}{4}$
10	12·01	4	18	33	38
12	14·35	4	21	38	$39\frac{1}{2}$
14	15·97	$4\frac{1}{2}$	$22\frac{5}{8}$	41	$49\frac{1}{4}$
15	17·01	$4\frac{1}{2}$	$23\frac{1}{2}$	42	$49\frac{1}{4}$
16	18·05	$4\frac{1}{2}$	$26\frac{1}{4}$	44	$49\frac{1}{4}$
18	20·25	$4\frac{1}{2}$	28	49	$50\frac{1}{4}$
20	22·33	$4\frac{1}{2}$	$32\frac{1}{2}$	54	$51\frac{3}{4}$
21	23·37	$4\frac{1}{2}$	$32\frac{1}{2}$	54	$52\frac{3}{4}$
24	26·47	5	35	61	$55\frac{3}{4}$

Prices on Application.

Flanges are drilled to British Standard Table 1, see page 75.

Sockets are in accordance with British Standard Table 4, Report No. 78—1917, see page 76.

Patent Nipple for Air Escape Valve Outlets

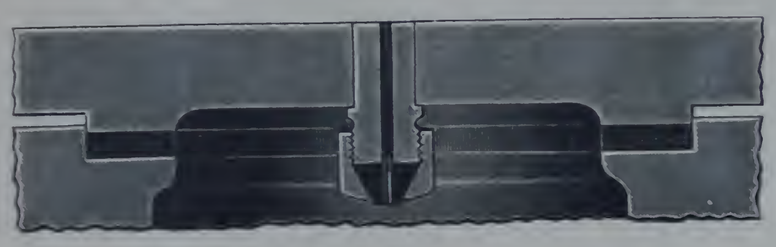


Fig. 2619.

Fig. 2621.

The old-fashioned thin sheet rubber seating still in vogue with other makers, having proved a constant source of trouble through sagging and creasing from insufficient support, we have evolved and patented a new form of Nipple for the small orifice outlet of Air Valves, which is now fitted to all Valves of this type made by us. As will be seen by reference to Fig. 2619, the new form of seating consists of a small conical-shaped rubber block held in position in the Nipple by means of a Gun-metal Nut. This arrangement provides a perfectly rigid seating, which is not only more effective in work, but also better adapted to resist wear than a thin sheet rubber seating which quickly perishes and requires to be frequently renewed.

Fig. 2621 Nipple has been designed for use where abnormal conditions necessitate frequent inspection, and may be fitted at a small additional cost.

Fig. 2621 Nipple may be withdrawn from the outside without isolating the Valve, the Ball making a reasonably tight joint against the Gun-metal Flange provided for the purpose.

Purpose and Principle of Automatic Air Escape Valves

For the purpose of releasing large quantities of air when a water main is being charged, and for the escape of air which afterwards accumulates under pressure, leading supply mains and pumping mains should be fitted with Self-acting Air Valves placed at every high point on the line of main.

Air Valves are of two kinds, *viz.*, Single-acting and Double-acting, the latter having two outlet chambers with balls, one of which lets out the large volume of air when the main is being charged, the other acting under pressure and allowing the escape of air which afterwards accumulates. Single Air Valves may be used for either of the two purposes named, but, of course, differ in construction according to the duty required.

The usual practice is to fix Double Air Valves on all water mains except in the immediate vicinity of Ball Hydrants, and Single Air Valves to act under pressure should be used in conjunction with Ball Hydrants.

Air Valves are constructed on the principle that the weight of the ball must be sufficient to overcome the upward force acting upon the area of the orifice on which the ball bears, due to the pressure of the air or water in the main.

The ball, of course, must float ; consequently, for high working pressures, the ball must be large in diameter. The sizes of Valves usually adopted are as follows :—

For Mains up to 6 in. diameter 2 in. Valve.
,, ,, ,, 12 in. ,, 3 in. ,,
,, ,, ,, 24 in. ,, 4 in. ,,

Air Escape Valves

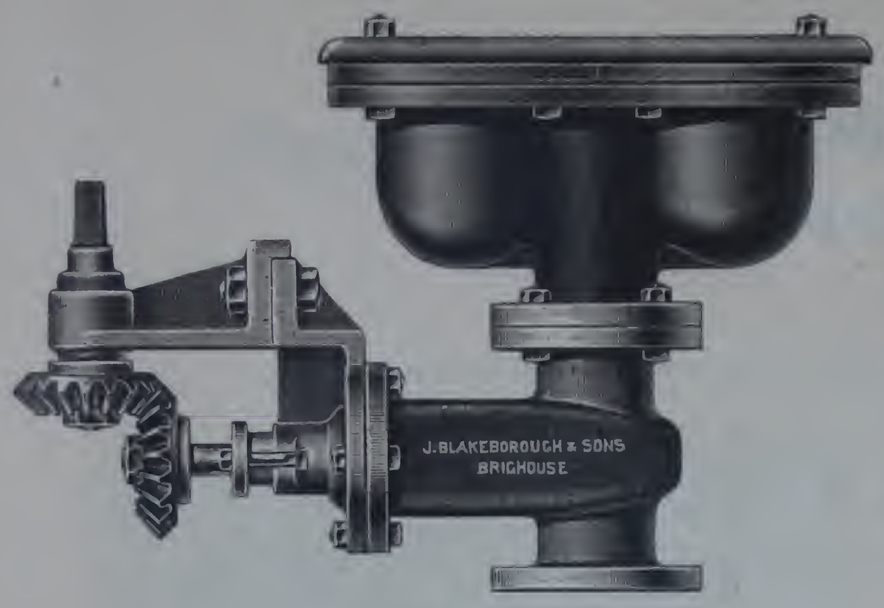


Fig. 2626.

Fig. 2626.—Double Air Valve (Fig. 2633 Pattern), provided with Sluice Valve underneath for isolating the Air Valve from the Main. The Sluice Valve is of the usual Waterworks Type, having Gun-metal Faces and Forged Bronze Spindle, and is operated by Bevel Gearing as illustrated.

PRICES

Size at Inlet ...	2 in.	3 in.	4 in.

For Dimensions see page 36.

Fig. 2627.—Double Air Valve fitted with Isolating Valve. The construction of this Valve is similar to Fig. 2633 page 33, with the addition of a Gun-metal Stop Valve of the "Mushroom" type, which enables the Air Valve to be isolated from the main to effect repairs. We strongly recommend this type of valve, the extra cost involved by the addition of the Stop Valve being trifling compared with the advantages derived by this arrangement.

PRICES

Size at Inlet ...	2 in.	2½ in.	3 in.	4 in.

For Dimensions see page 37.

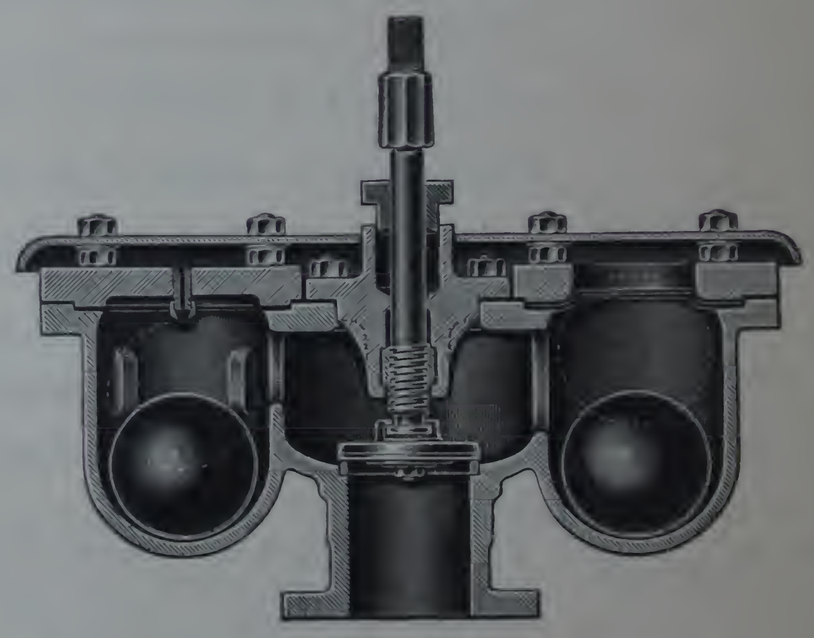


Fig. 2627.

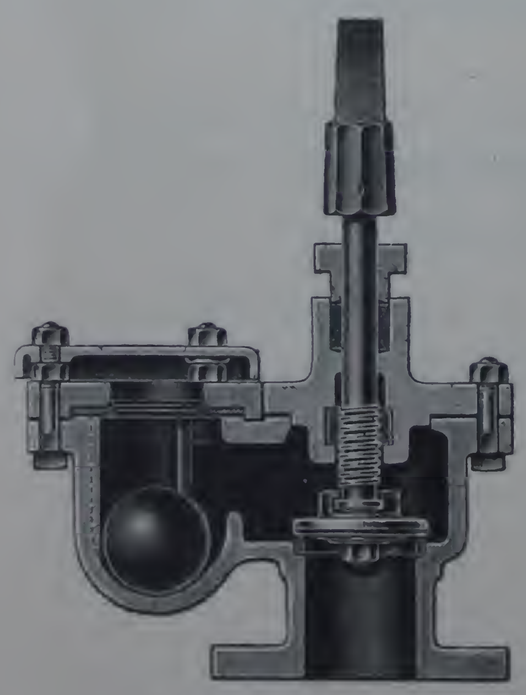


Fig. 2630.

Fig. 2630.—Single Air Valve fitted with Isolating Valve. The construction of this Valve is similar to Fig. 2627, but with one Outlet Chamber only for releasing large volumes of air when charging the mains.

PRICES

Size at Inlet ...	2 in.	3 in.	4 in.

For Dimensions see page 40.

Air Escape Valves

Fig. 2631.

Fig. 2631.—Single Air Valve, with large Outlet for releasing air in volume when charging the mains. Alternatively, this pattern may be supplied with small orifice outlet for the escape of air under pressure.

PRICES

Size at Inlet	...	2 in.	2 in.	3 in.	3 in.
Dia. of Ball	...	3 in.	4 in.	4 in.	5 in.

Prices of other sizes on application.

For Dimensions see page 38.

Fig. 2635.—Single Air Valve, with large Outlet for releasing air in volume when charging the mains.

PRICES

Size at Inlet	...	...	2 in.	3 in.

Fig. 2635.

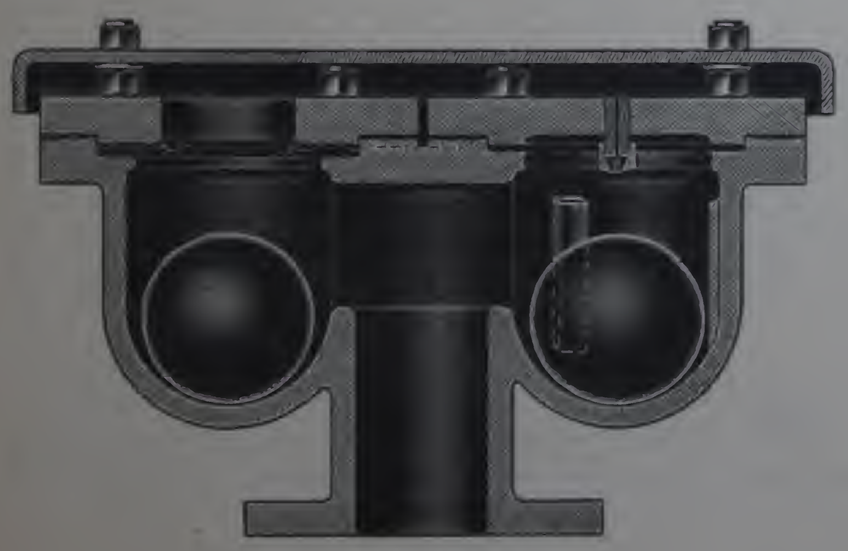


Fig. 2633.

Fig. 2633.—Double Air Valve, suitable for small or medium-sized mains. This Valve has two Ball Chambers, one outlet providing an exit for large volumes of air when charging the mains and the other for the escape of air under pressure. The Balls are ebonite covered and the Seatings of rubber.

PRICES

Size at Inlet	...	2 in.	2½ in.	3 in.	4 in.

For Dimensions see page 39.

Air Escape Valves

Fig. 2637.

Fig. 2638.

Fig. 2639.

Fig. 2640.

Fig. 2637. Double Air Valve, provided with extra strong Gun-metal Stop Cock for isolating the Valve from the main.

Fig. 2638. Double Air Valve, as Fig. 2637, but without Stop Cock.

Fig. 2639. Single Air Valve, similar in design to Fig. 2637 Double Air Valve, with large orifice for releasing air in volume when charging mains ; provided with extra strong Gun-metal Stop Cock for isolating the Valve from the main.

Fig. 2640. Single Air Valve, as Fig. 2639, but without Stop Cock.

Dimensions in Inches.

Fig. No.	2637		2638		2639		2640	
Size of Inlet	$\frac{3}{4}$	1	$\frac{3}{4}$	1	$\frac{3}{4}$	1	$\frac{3}{4}$	1
Overall Horizontal Dimensions	11×6	11×6	9×6	9×6	$9\frac{1}{2}$×5	$9\frac{1}{2}$×5	5×5	5×5
Overall Height	$16\frac{1}{2}$	$16\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	13	13	9	9
Size of Ball	$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$
Price complete								
Suitable Surface Box ... Fig.	9060	9060	9060	9060	9060	9060	9060	9060

Air Escape Valves

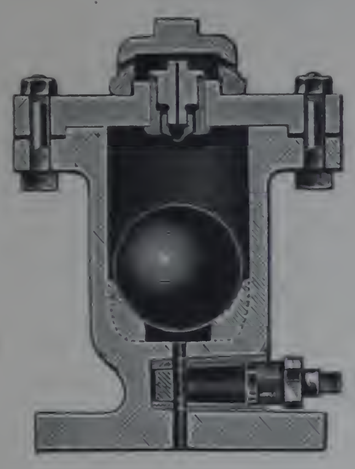


Fig. 2636.

Fig. 2641.

Fig. 2642.

Fig. 2636. Single Air Valve, with small orifice outlet for the escape of air under pressure, provided with Gun-metal Plug Cock for isolating the Valve.

Fig. 2641. Single Air Valve with large orifice for releasing air in volume when charging the main ; provided with extra strong Gun-metal Stop Cock for isolating the Valve from the main.

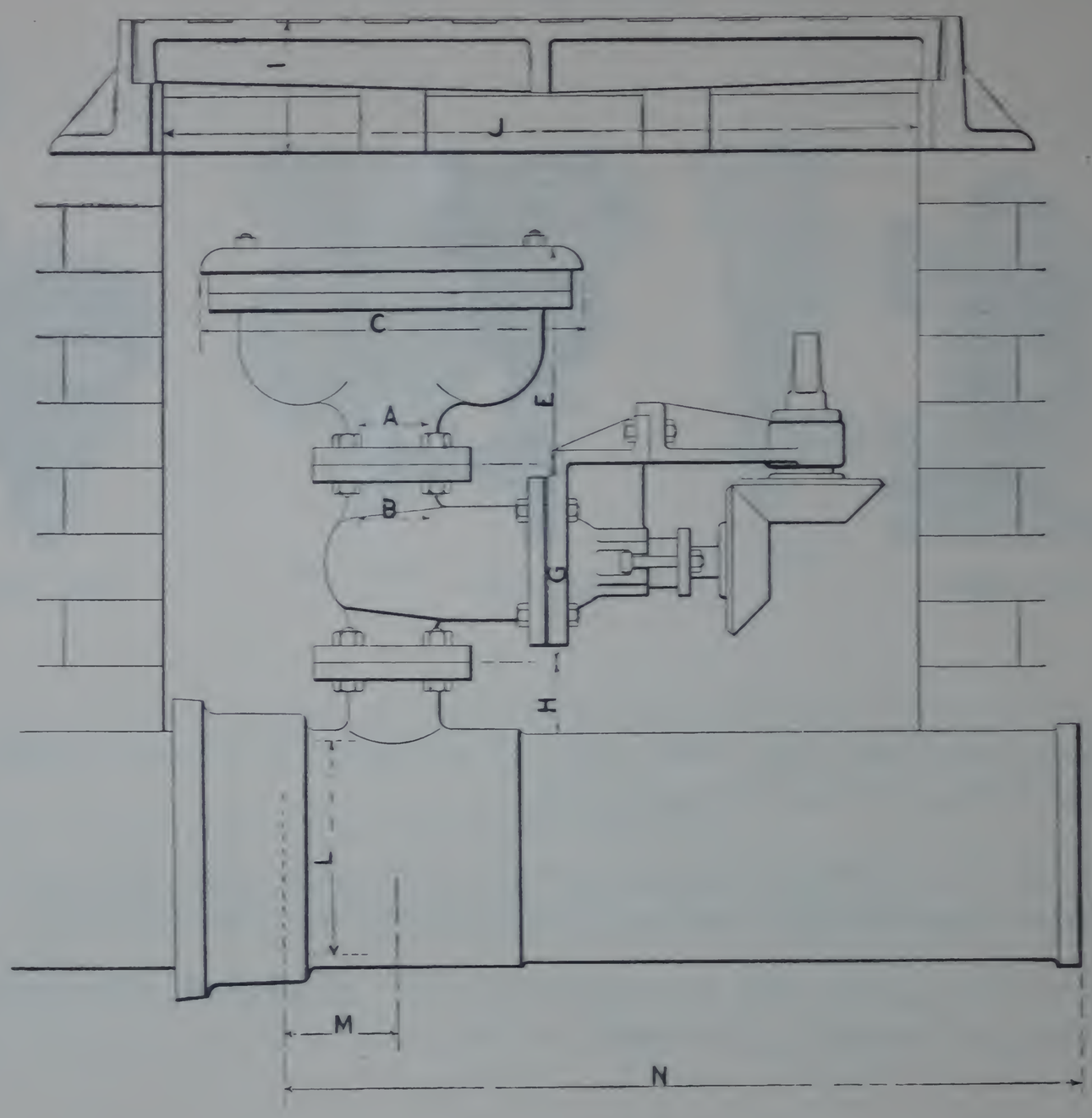
Fig. 2642. Single Air Valve, as Fig. 2641, but without Stop Cock. Alternatively, this pattern may be supplied with Flange for connecting to Tee-piece.

Dimensions in Inches.

Fig. No.	2636	2641				2642		
Size of Inlet		$\frac{3}{4}$	1	1	1	$\frac{3}{4}$ & 1	1	1
Overall Horizontal Dimensions	9×9	$9\frac{1}{2}\times7$	$9\frac{1}{2}\times7$	$11\times8\frac{1}{2}$	$11\frac{3}{4}\times10\frac{1}{4}$	7×7	$8\frac{1}{2}\times8\frac{1}{2}$	$10\frac{1}{4}\times10\frac{1}{4}$
Overall Height	12	$11\frac{1}{2}$	$11\frac{1}{2}$	15	$16\frac{1}{4}$	9	11	13
Size of Ball	$3\frac{5}{8}$	3	3	4	5	3	4	5
Price complete								
Suitable Surface Box ... Fig.	9065	9065	9065	9080	9080	9065	9065	9080

Air Escape Valves

Fig. 2626.



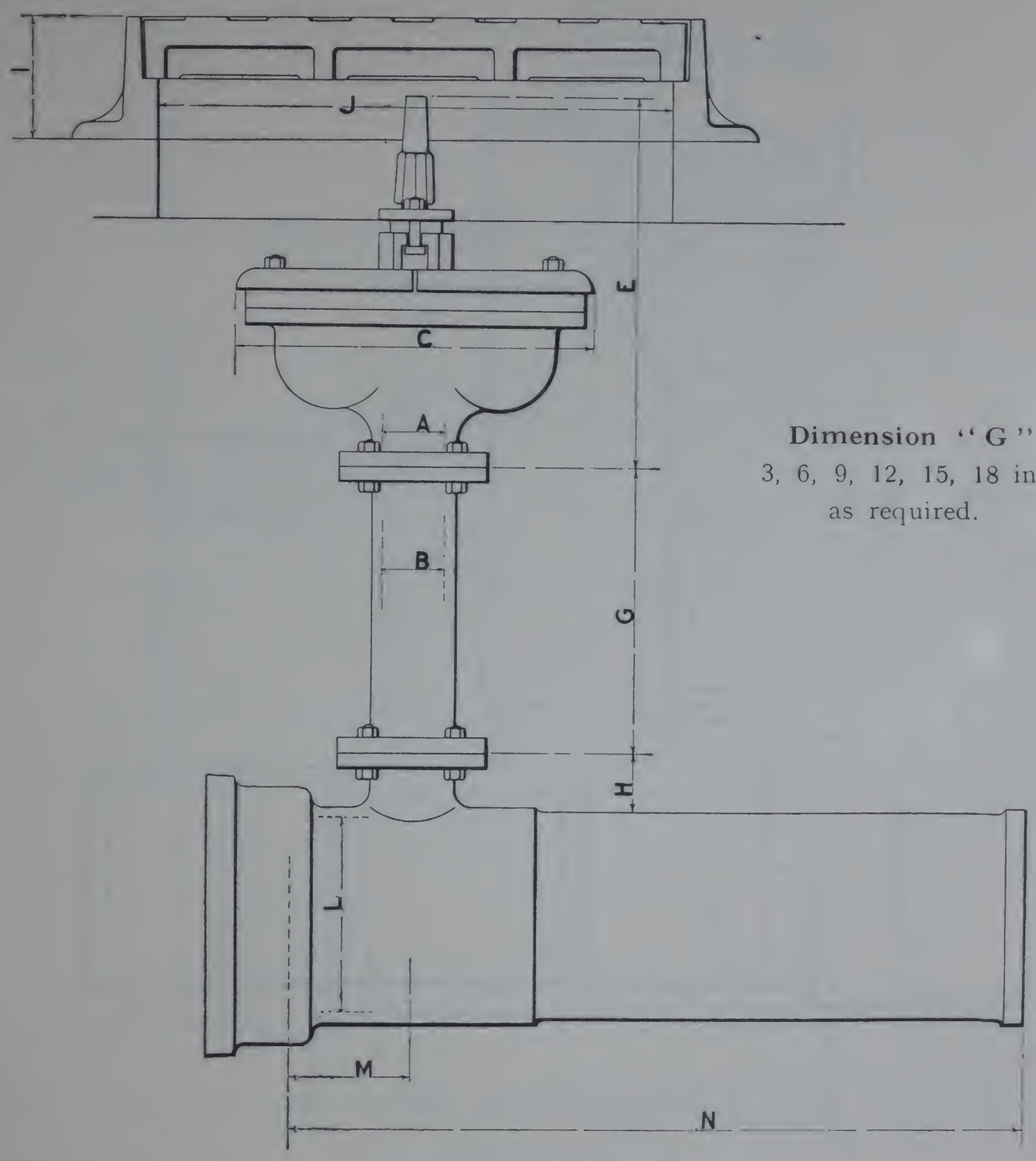
Dimensions in Inches.

A	B	C	E	G	H	I	J	Surface Box Fig.	Diam. of Flange	Crs. of Bolts	No.& size of Bolts
2	2	14½ × 7⅜	9	8½	4½	6	30 × 12	9178	8	6½	4—⅝
2½	2½	17 × 9¼	10⅜	8½	4½	6	34 × 16	9365	8	6½	4—⅝
3	3	17½ × 9½	11½	9	4½	6	34 × 16	9365	8	6½	4—⅝
4	4	23 × 12	14	10½	4½	6	41¼ × 22¼	9372	8½	7	4—⅝

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

Air Escape Valves

Fig. 2627.



Dimension "G"
3, 6, 9, 12, 15, 18 in.
as required.

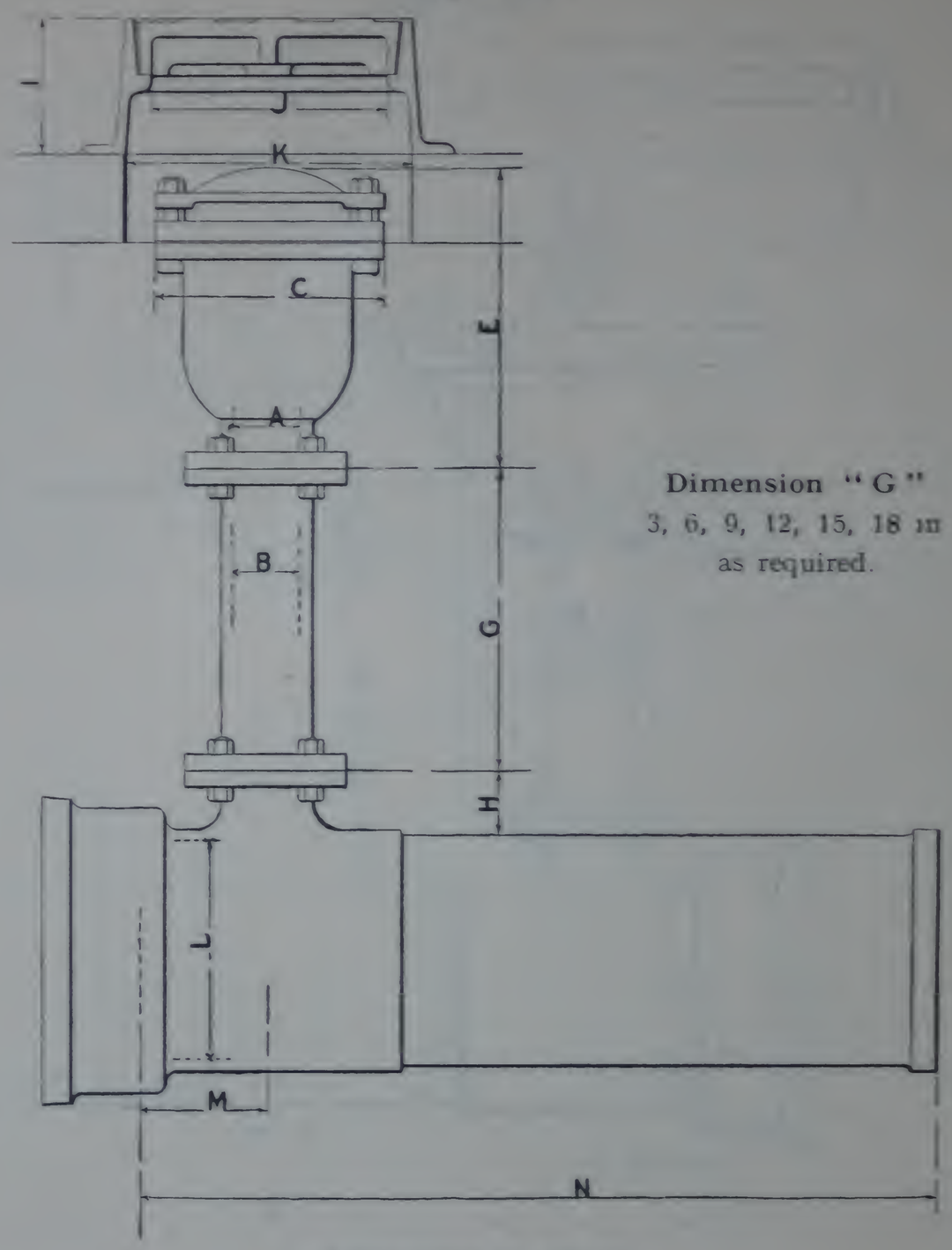
Dimensions in Inches.

A	B	C	E	G	H	I	J	Surface Box Fig.	Diam. of Flanges	Crs. of Bolts	No. & size of Bolts
2	3	$18\frac{1}{2} \times 7\frac{3}{4}$	16	See Note Above	$4\frac{1}{2}$	$6\frac{1}{2}$	$26\frac{3}{4} \times 13\frac{3}{4}$	9348	8	$6\frac{1}{2}$	$4—\frac{5}{8}$
$2\frac{1}{2}$	3	$21 \times 9\frac{1}{4}$	17		$4\frac{1}{2}$	$6\frac{1}{2}$	$26\frac{3}{4} \times 13\frac{3}{4}$	9348	8	$6\frac{1}{2}$	$4—\frac{5}{8}$
3	3	$22 \times 9\frac{3}{4}$	18		$4\frac{1}{2}$	$6\frac{1}{2}$	$26\frac{3}{4} \times 13\frac{3}{4}$	9348	8	$6\frac{1}{2}$	$4—\frac{5}{8}$
4	4	$26\frac{1}{2} \times 12\frac{1}{2}$	21		$4\frac{1}{2}$	$6\frac{1}{2}$	$26\frac{3}{4} \times 13\frac{3}{4}$	9348	$8\frac{1}{2}$	7	$4—\frac{5}{8}$

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

Air Escape Valves

Fig. 2631.



Dimension "G"
3, 6, 9, 12, 15, 18 in
as required.

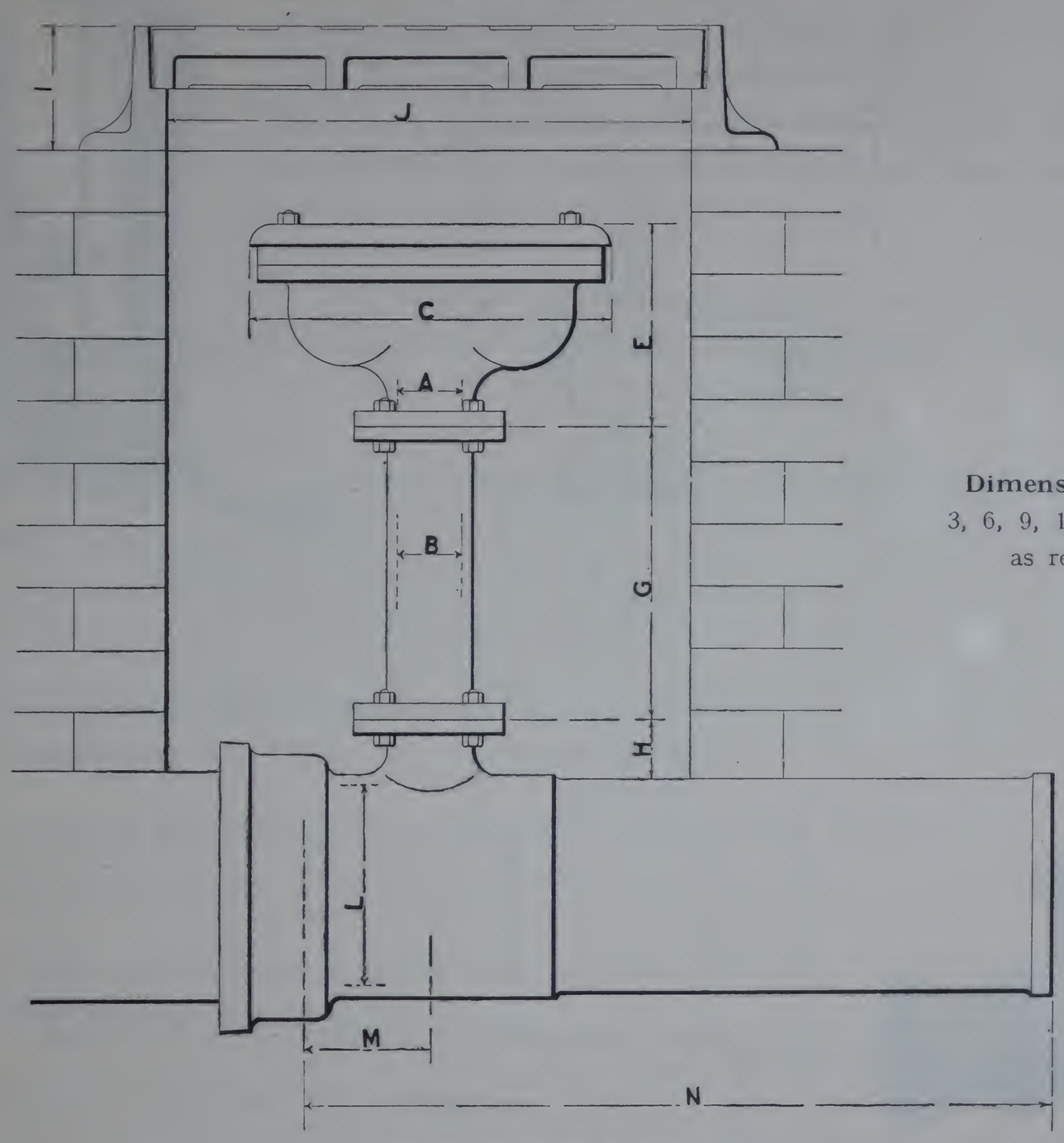
Dimensions in Inches.

A	B	C	E	Diam. of Ball	G	H	I	J	K	Surface Box Fig.	Diam. of Flanges	Crs. of Bolts	No.&size of Bolts
2	3	8 × 8	8½	3	See Note Above	4½	6	10¼ × 10¼	13 × 13	9065	8	6½	4—⅝
2	3	9 × 9	11	4		4½	6	10¼ × 10¼	13 × 13	9065	8	6½	4—⅝
3	3	9 × 9	11	4		4½	6	10¼ × 10¼	13 × 13	9065	8	6½	4—¾
3	3	11½ × 11½	14	5		4½	6	12¾ × 12¾	15½ × 15½	9080	8	6½	4—⅝

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

Air Escape Valves

Fig. 2633.



Dimension " G "
3, 6, 9, 12, 15, 18 in.
as required.

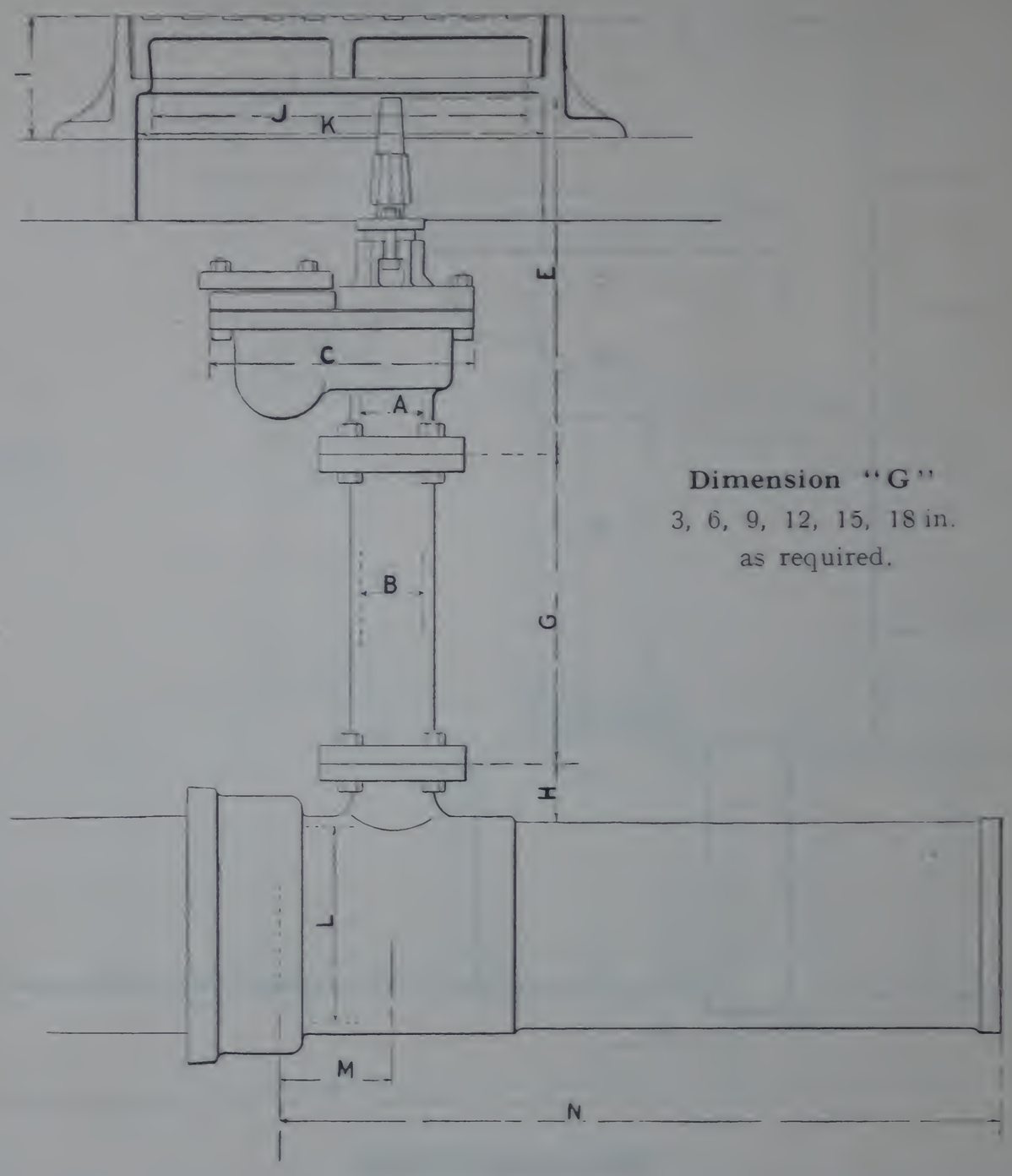
Dimensions in Inches.

A	B	C	E	G	H	I	J	Surface Box Fig.	Diam. of Flanges	Crs. of Bolts	No. & size of Bolts
2	3	$14\frac{1}{2} \times 7\frac{3}{4}$	9	See Note Above	$4\frac{1}{2}$	$6\frac{1}{2}$	$26\frac{3}{4} \times 13\frac{3}{4}$	9348	8	$6\frac{1}{2}$	$4—\frac{5}{8}$
$2\frac{1}{2}$	3	$17 \times 9\frac{1}{4}$	$10\frac{3}{4}$		$4\frac{1}{2}$	$6\frac{1}{2}$	$26\frac{3}{4} \times 13\frac{3}{4}$	9348	8	$6\frac{1}{2}$	$4—\frac{5}{8}$
3	3	$18\frac{3}{4} \times 9\frac{3}{4}$	$11\frac{1}{2}$		$4\frac{1}{2}$	$6\frac{1}{2}$	$26\frac{3}{4} \times 13\frac{3}{4}$	9348	8	$6\frac{1}{2}$	$4—\frac{5}{8}$
4	4	23×12	14		$4\frac{1}{2}$	$6\frac{1}{2}$	$26\frac{3}{4} \times 13\frac{3}{4}$	9348	$8\frac{1}{2}$	7	$4—\frac{5}{8}$

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

Air Escape Valves

Fig. 2630.



Dimension "G"
3, 6, 9, 12, 15, 18 in.
as required.

Dimensions in Inches.

A	B	C	E	G	H	I	J	K	Surface Box Fig.	Diam. of Flanges	Crs. of Bolts	No. & size of Bolts
2	3	16 × 9	16	See Note Above	4½	6	18×10	20 ×12	9336	8	6½	4—⅝
3	3	16 × 9	16		4½	6	18×10	20 ×12	9336	8	6½	4—⅝
4	4	18½×11	21		4½	6½	25×12	26¾×13¾	9348	8½	7	4—⅝

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

Sluice Valve Fire Hydrants

Fig. 2650.

Fig. 2650. Sluice Valve Fire Hydrant, consisting of Heavy Pattern Double Flanged Sluice Valve having four Gun-metal Faces, Forged Bronze Spindle and Gun-metal Nut, Socket bolted on inlet, Duckfoot Bend with Gun-metal Screwed Outlet, Chained Cast Iron Loose Cap to protect outlet and Gun-metal Frost Cock with T Handle.

The Bend is provided with Foot and is of short radius to make the Hydrant compact and suitable for fixing in roadways. This Hydrant provides a full, clear and unobstructed waterway.

Screwed Outlets are made to Old London Brigade Gauge, unless ordered otherwise.

Fig. 2651. Sluice Valve Fire Hydrant, similar in all respects to Fig. 2650, but having Bayonet Lug Outlet with Gun-metal Seating.

A Gun-metal Automatic Frost Valve for emptying Figs. 2650 and 2651 Hydrants is supplied if desired in lieu of the Frost Cock with T Handle.

When ordering Hydrants with Bayonet Lugs, the size of the Outlet Aperture and the distance between the Lugs should be given.

For dimensions of Figs. 2650 *and* 2651 *see page* 51.

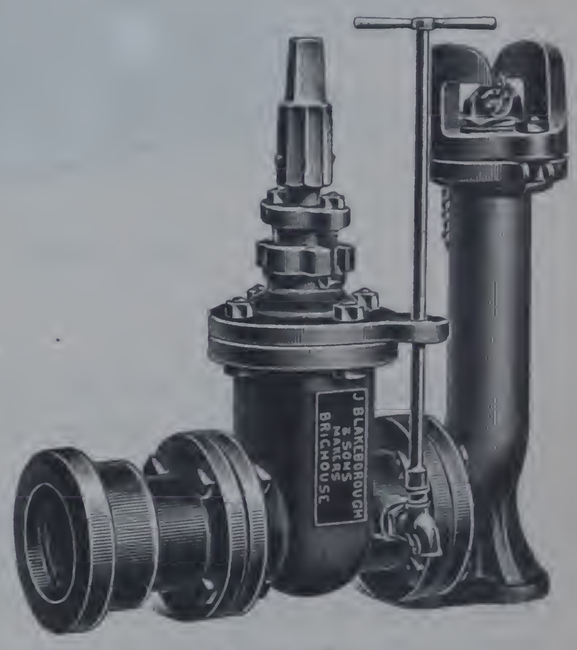


Fig. 2651.

Fig. 2657.

Fig. 2657. Sluice Valve Fire Hydrant, consisting of Heavy Pattern Sluice Valve having four Gun-metal Faces, Forged Bronze Spindle and Gun-metal Nut; Duckfoot Bend having Bayonet Lug Outlet with Gun-metal Seating, and Baker's Automatic Frost Valve, which can be easily inserted or withdrawn through the Outlet.

When ordering Hydrants with Bayonet Lugs, the size of the Outlet Aperture and the distance between the Lugs should be given.

London County Council

Single Sluice Valve Hydrant and Surface Box

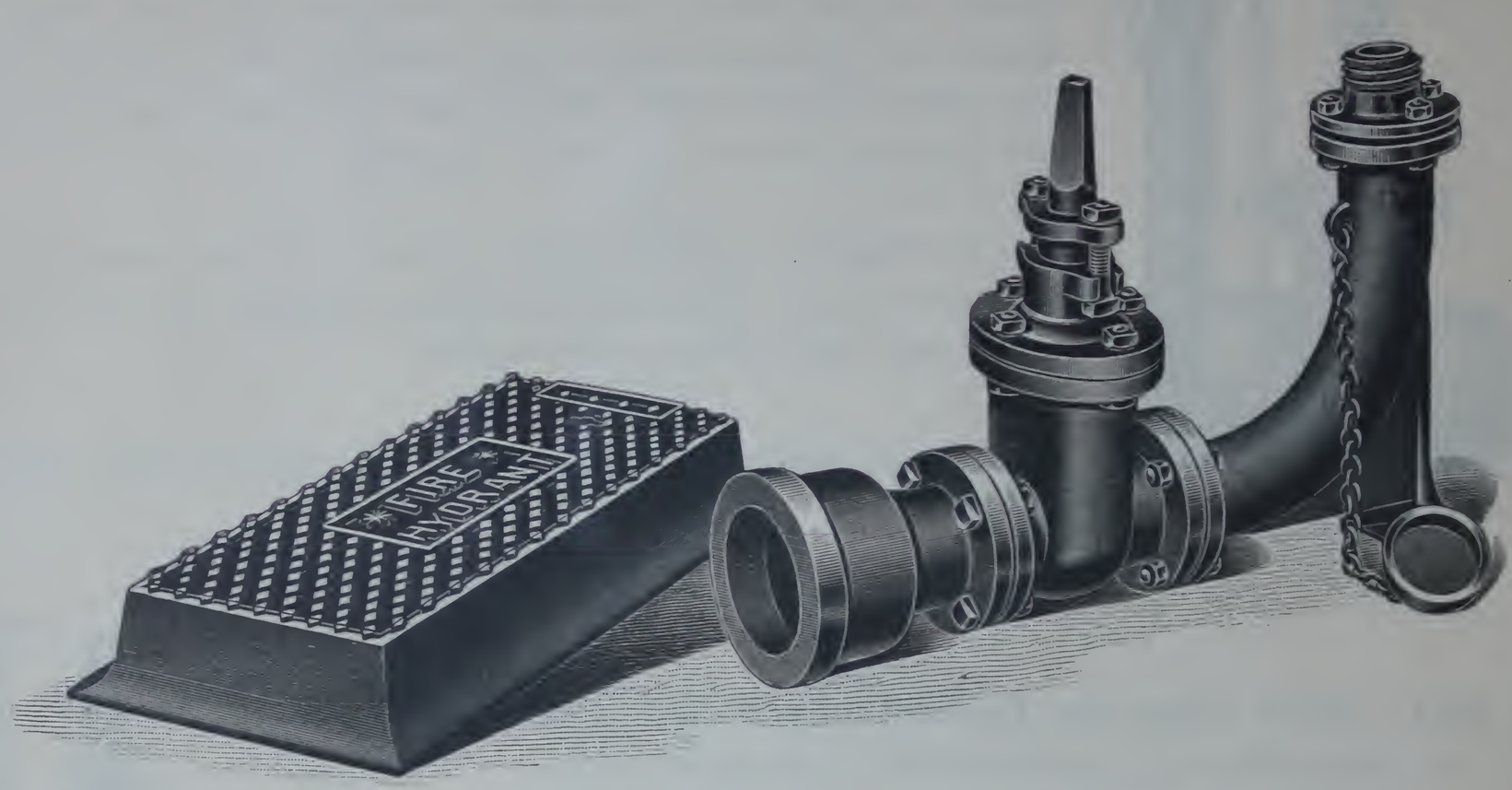


Fig. 9165. **Fig. 2655.**

Screwed Outlets for this Hydrant are made to New London Brigade Gauge unless ordered otherwise.

This Hydrant consists of a 3 in. Heavy Pattern Double Flanged Sluice Valve having four Gun-metal Faces, Forged Bronze Spindle and Gun-metal Nut ; Duckfoot Bend fitted with Gun-metal Outlet screwed to New London Brigade Gauge, Chained Cast Iron Loose Cap to protect Outlet, and Baker's Automatic Frost Valve which can be easily inserted or withdrawn through the Outlet. Unless ordered otherwise, this Hydrant has a Spindle with Double Thread for quick opening. A Spindle of ordinary pitch may, however, be supplied if desired.

PRICES.

Fig. 2655. London County Council Single Hydrant with 3 in. Socket Inlet bolted on, and complete with Fig. 9165 Surface Box (dimensions of Surface Box inside at base, 28 in. × 11 in. × 4 in. deep) ... ...

,, Ditto, with 4 in. Socket Inlet bolted on, and complete with Surface Box ...

Overall height, 21½ in.

Hydrant tested to 600 ft. head of water.

All Sluice Valve Hydrants open with a **right-hand** motion unless ordered otherwise.

London County Council

Double Sluice Valve Hydrant and Surface Box

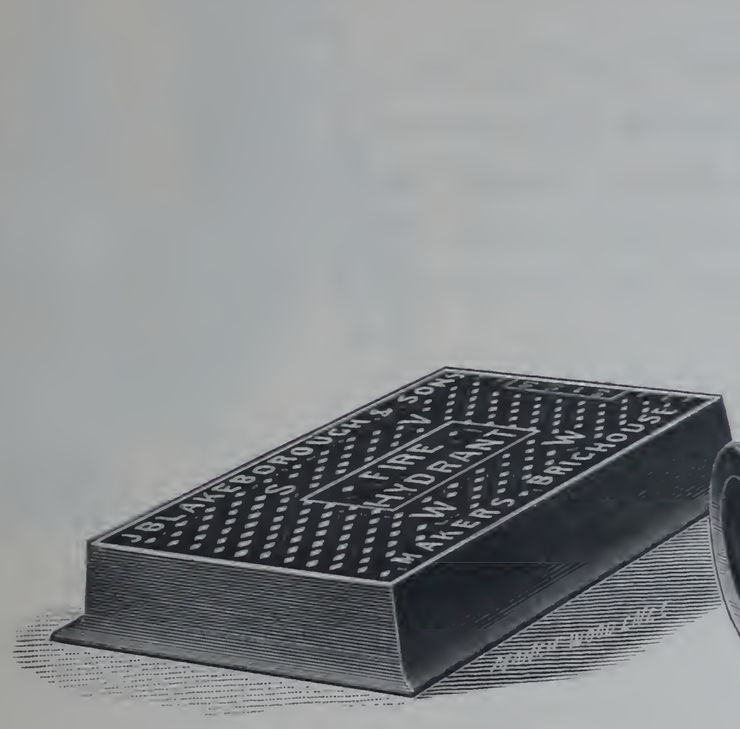


Fig. 9166.

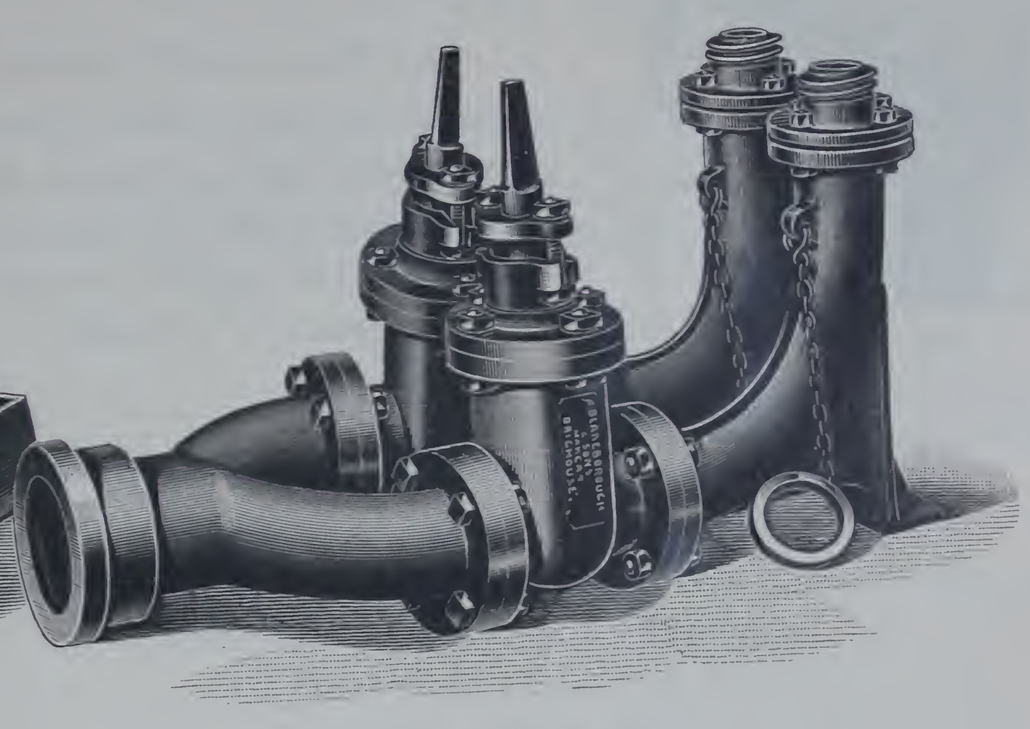


Fig. 2656.

Screwed Outlets for this Hydrant are made to New London Brigade Gauge unless ordered otherwise.

This Hydrant is constructed to allow two lengths of hose to be worked from the same point. Should one hose burst or not be required, the supply can be cut off without interfering with the working of the other hose.

The Hydrant consists of Breeching Pipe, with 4 in. Socket Inlet, 3 in. Double Flanged Sluice Valves having four Gun-metal Faces, Forged Bronze Spindle, and Gun-metal Nut ; Duckfoot Bends fitted with Gun-metal Outlets screwed to New London Brigade Gauge, Chained Cast Iron Loose Caps to protect Outlets, and Baker's Automatic Frost Valves which can be inserted or withdrawn through the Outlets. Unless ordered otherwise, this Hydrant has Spindles with Double Thread for quick opening. Spindles of ordinary pitch may, however, be supplied if desired.

PRICE.

Fig. 2656. London County Council Double Hydrant complete with Fig. 9166 Surface Box (dimensions of Surface Box inside at base, 28 in. × 15 in. × 4 in. deep) ...

Overall height, 21½ in.

Hydrant tested to 600 ft. head of water.

All Sluice Valve Hydrants open with a **right-hand** motion unless ordered otherwise.

Screwdown Fire Hydrants

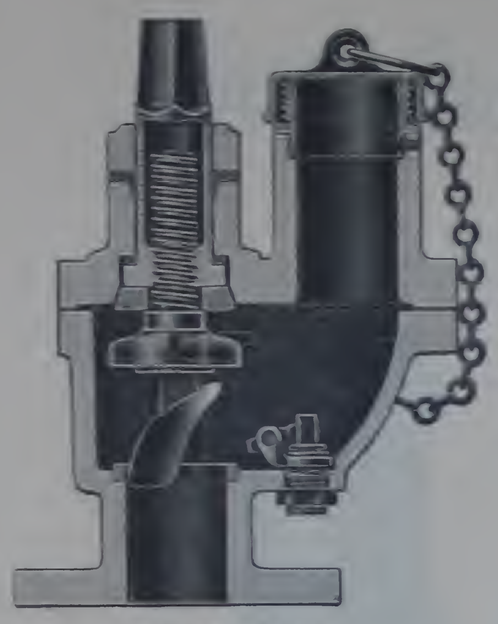


Fig. 2660.

Screwed Outlets are made to Old London Brigade Gauge unless ordered otherwise.

Fig. 2660.—Screwdown Hydrant with Automatic Frost Valve, Frictionless Packing and Water Guide. The Spindle is of Forged Bronze, and the Valve, Water Guide, Valve Seat, Valve Guides, Screwed Outlet, Frost Valve, Gland Bush, and Bush in Cover are of Gun-metal.

This Hydrant has an exceptionally high lift, and will pass a greater volume of water than any other Screwdown Hydrant on the market. When in use the Water Guide directs the flow of water towards the Outlet. The Valve lifts with the operation of the Spindle, and is, therefore, suitable for low as well as high pressures. The Spindle revolves, but does not rise—a favourable feature where little headroom is available.

PRICES

	Diameter of Inlet ...	2½ in.	3 in.
Fig. 2660.—As illustrated, with Frost Valve and Water Guide, and with Chained Cast-iron Loose Cap to protect Outlet			
,,	Ditto, but with Frost Valve only		
,,	Ditto, but with Water Guide only		
,,	Ditto, but without Frost Valve and Water Guide		

This Hydrant is supplied, if required, with Stuffing Box for Ordinary Hemp Packing in lieu of Frictionless Packing.

Fig. 2661.—Screwdown Fire Hydrant. Similar in all respects to Fig. 2660, but having Bayonet Lug Outlet with Gun-metal Seating.

Fig. 2661.

When ordering Hydrants with Bayonet Lugs, the size of the Outlet Aperture and the distance between the Lugs should be given.

PRICES

	Diameter of Inlet ...	2½ in.	3 in.
Fig. 2661.—As illustrated, with Frost Valve and Water Guide, and with Chained Cast-iron Cap to protect Outlet ...			
,,	Ditto, but with Frost Valve only ...		
,,	Ditto, but with Water Guide only ...		
,,	Ditto, but without Frost Valve and Water Guide		

This Hydrant is supplied, if desired, with Stuffing Box for Ordinary Hemp Packing in lieu of Frictionless Packing.

All tested to 600 ft. head of water.

All Screwdown Hydrants open with a **left-hand** motion unless ordered otherwise.

For Dimensions see page 52.

Screwdown Fire Hydrants

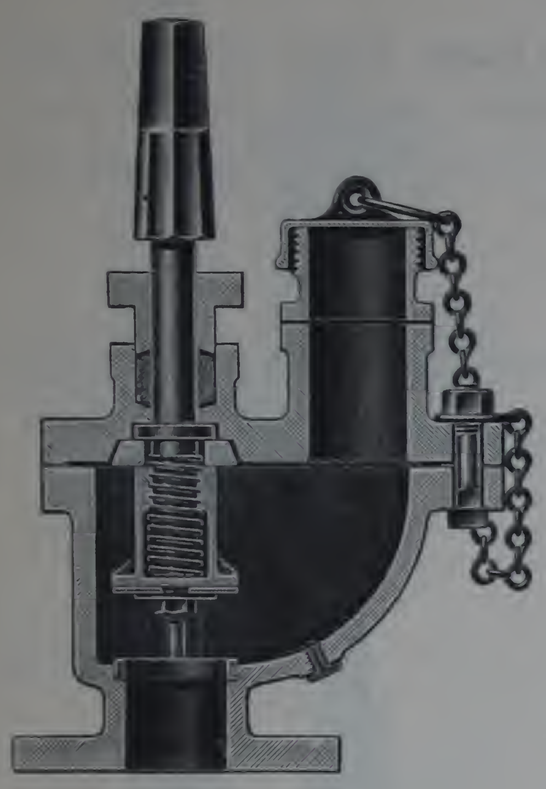


Fig. 2662.

Screwed Outlets are made to Old London Brigade Gauge unless ordered otherwise.

Fig. 2662.—Screwdown Hydrant, with Internal Screwed Valve, having Forged Bronze Spindle, Gun-metal Valve, Seat, and Valve Guides, and fitted with Gun-metal Self-acting Frost Plug. The Gun-metal Screwed Outlet has an Oval Flange with two bolts.

The Valve lifts with the operation of the Spindle, and is therefore suitable for low as well as high pressures. The Spindle revolves, but does not rise—a favourable feature where little headroom is available.

PRICES

	Diameter of Inlet ...	$2\frac{1}{2}$ in.	3 in.
Fig. 2662.—Complete, with Chained Cast-iron Loose Cap to protect Outlet			
,,	Ditto, but without Frost Plug		

Fig. 2663.—Screwdown Hydrant, with Internal Screwed Valve. Similar in every respect to Fig. 2662, but having Bayonet Lug Outlet with Gun-metal Seating.

PRICES

	Diameter of Inlet ...	$2\frac{1}{2}$ in.	3 in.
Fig. 2663.—Complete, with Chained Cast-iron Cap to protect Outlet			
,,	Ditto, but without Frost Plug		

All tested to 600 ft. head of water.

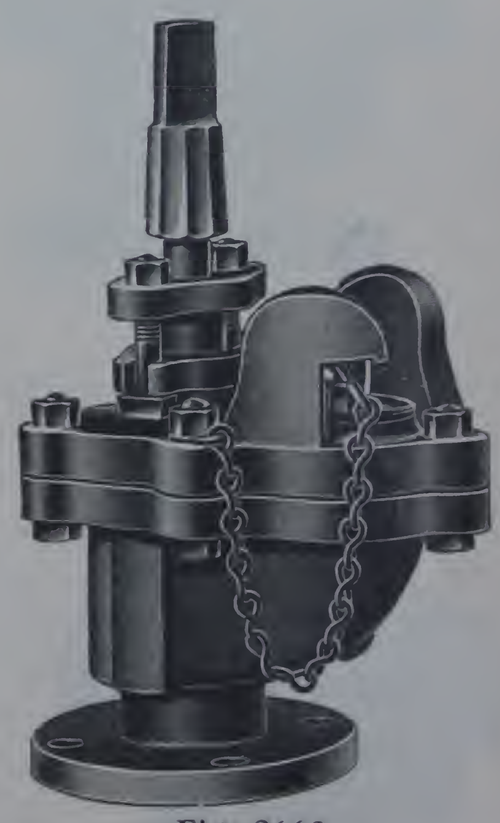


Fig. 2663.

When ordering Hydrants with Bayonet Lugs, the size of the Outlet Aperture and the distance between the Lugs should be given.

All Screwdown Hydrants open with a **left-hand** motion unless ordered otherwise.

For Dimensions see page 53.

Screwdown Fire Hydrants

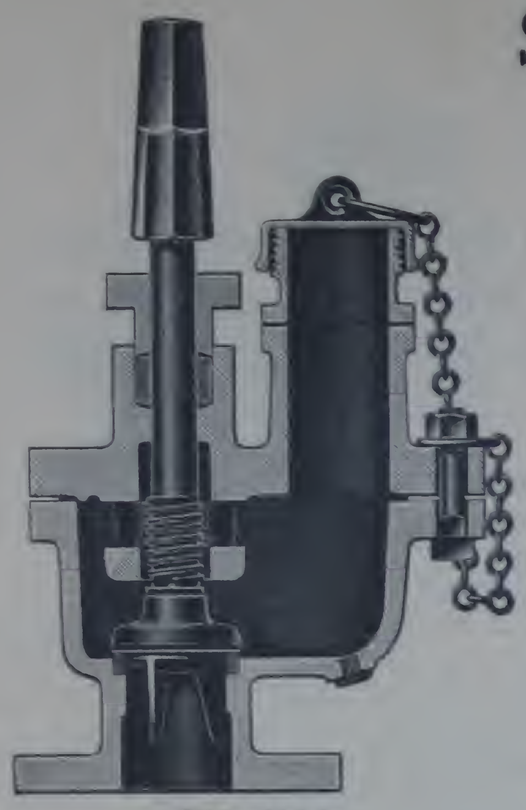


Fig. 2664.
Screwed Outlets are made to Old London Brigade Gauge unless ordered otherwise.

Fig. 2664.—Screwdown Hydrant, with Loose Wing Valve; Forged Bronze Spindle and Gun-metal Nut, Gun-metal Seat, Stopper with Gun-metal Wings, and fitted with Gun-metal Self-acting Frost Plug. The Gun-metal Screwed Outlet has an oval flange with two bolts.

PRICES

	Diameter of Inlet ...	2½ in.	3 in.
Complete with Chained Cast-iron Loose Cap to protect Outlet			
Ditto, but without Frost Plug			

Fig. 2666.—Screwdown Hydrant, with Loose Wing Valve. Similar in every respect to Fig. 2664, but with Round Outlet Flange having three bolts.

PRICES

	Diameter of Inlet ...	2½ in.	3 in.
Complete, with Chained Cast-iron Loose Cap to protect Outlet			
Ditto, but without Frost Plug			

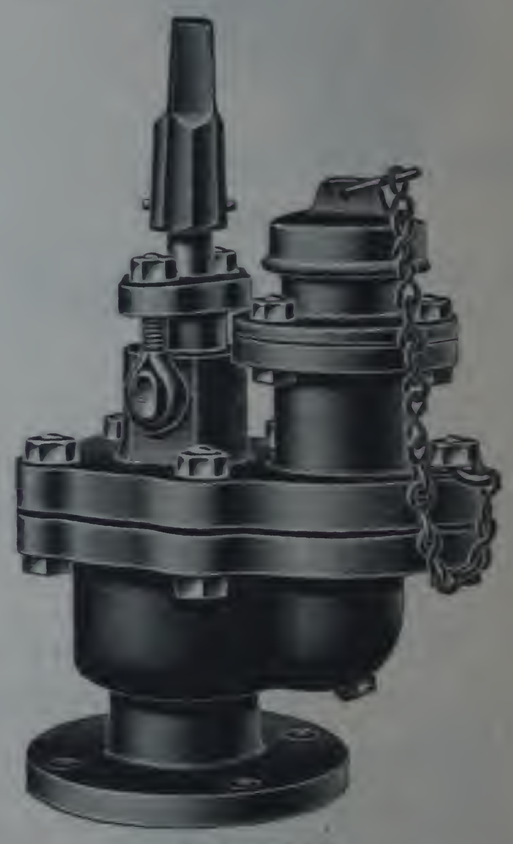


Fig. 2666.
Screwed Outlets are made to Old London Brigade Gauge unless ordered otherwise.

Fig. 2665.
When ordering Hydrants with Bayonet Lugs, the size of the Outlet Aperture and the distance between the Lugs should be given.

Fig. 2665.—Screwdown Hydrant with Loose Wing Valve. Similar in every respect to Fig. 2664, but having Bayonet Lug Outlet with Gun-metal Seating.

PRICES

	Diameter of Inlet ...	2½ in.	3 in.
Complete, with Chained Cast-iron Cap to protect Outlet			
Ditto, but without Frost Plug			

All tested to 600 ft. head of water.

All Screwdown Hydrants open with a **left-hand** motion unless ordered otherwise.

For Dimensions see page 54.

Screwdown Fire Hydrants

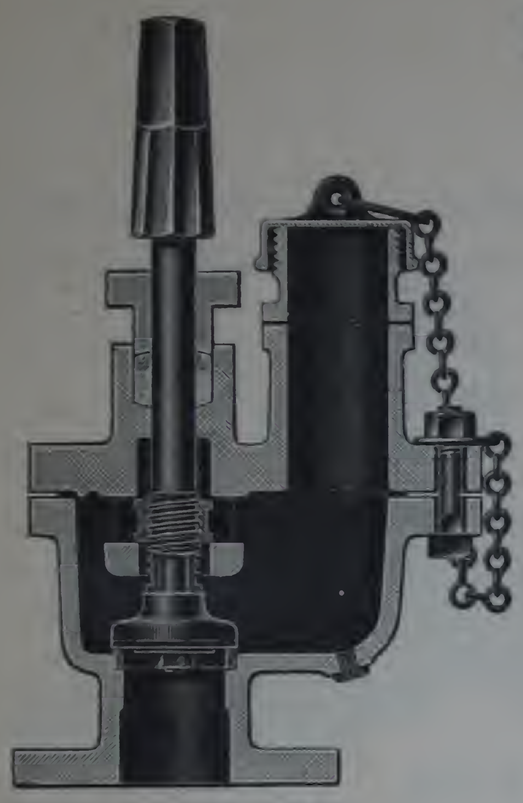


Fig. 2667.

Screwed Outlets are made to Old London Brigade Gauge unless ordered otherwise.

Fig. 2667.—Loose Valve Screwdown Hydrant, having Forged Bronze Spindle and Gun-metal Nut, Gun-metal Seat and Stopper, and fitted with Gun-metal Self-acting Frost Plug. The Gun-metal Screwed Outlet has an Oval Flange with two bolts.

PRICES

	Diameter of Inlet ...	$2\frac{1}{2}$ in.	3 in.	4 in.
Complete, with Chained Cast-iron Loose Cap to protect Outlet				
Ditto, but without Frost Plug				

Fig. 2668.

When ordering Hydrants with Bayonet Lugs, the size of the Outlet Aperture and the distance between the Lugs should be given.

Fig. 2668.—Loose Valve Screwdown Hydrant. Similar in every respect to Fig. 2667, but having Bayonet Lug Outlet with Gun-metal Seating.

PRICES

	Diameter of Inlet ...	$2\frac{1}{2}$ in.	3 in.	4 in.
Complete, with Chained Cast-iron Loose Cap to protect Outlet				
Ditto, but without Frost Plug				

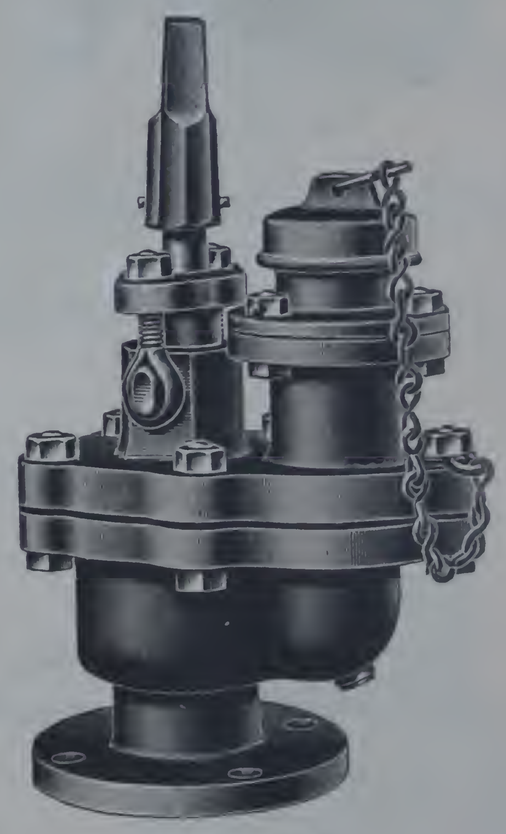


Fig. 2669.

Screwed Outlets are made to Old London Brigade Gauge unless ordered otherwise.

Fig. 2669.—Loose Valve Screwdown Hydrant. Similar in every respect to Fig. 2667, but having Round Outlet Flange with three bolts.

PRICES

	Diameter of Inlet ...	$2\frac{1}{2}$ in.	3 in.	4 in.
Complete, with Chained Cast-iron Loose Cap to protect Outlet				
Ditto, but without Frost Plug				

All tested to 600 ft. head of water.

All Screwdown Hydrants open with a **left-hand** motion unless ordered otherwise.

For Dimensions see page 54.

Screwdown Fire Hydrants

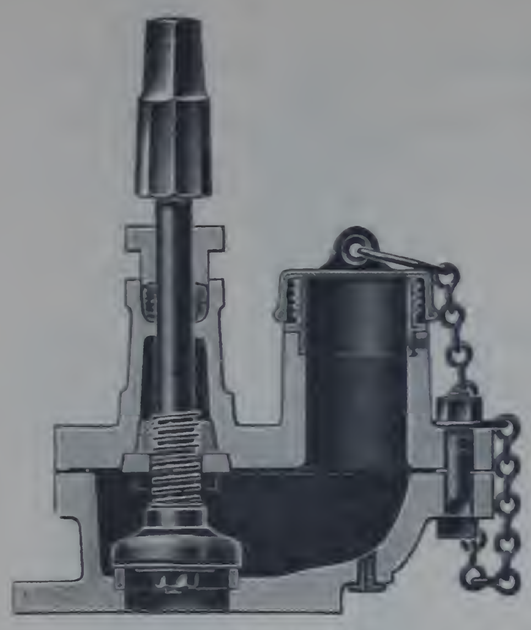


Fig. 2670.

Screwed Outlets are made to Old London Brigade Gauge unless ordered otherwise.

Fig. 2670.—Loose Valve Screwdown Hydrant, having Forged Bronze Spindle and Gun-metal Nut, Gun-metal Seat and Stopper, and fitted with Gun-metal Self-acting Frost Plug.

PRICES

Diameter of Inlet ...	2 in.	2½ in.	3 in.
Complete, with Chained Cast-iron Loose Cap to protect Outlet			
Ditto, but without Frost Plug			
*Ditto ditto and without Gun-metal Valve Seating			

* Not recommended without Gun-metal Valve Seatings, but listed to meet similar low-priced Hydrants offered by other makers.

Fig. 2671.

When ordering Hydrants with Bayonet Lugs, the size of the Outlet Aperture and the distance between the Lugs should be given.

Fig. 2671.—Loose Valve Screwdown Hydrant. Similar in every respect to Fig. 2670, but having Bayonet Lug Outlet with Gun-metal Seating.

PRICES

Diameter of Inlet ...	2 in.	2½ in.	3 in.
Complete, with Chained Cast-iron Cap to protect Outlet			
Ditto, but without Frost Plug			
*Ditto ditto and without Gun-metal Valve Seating			

* Not recommended without Gun-metal Valve Seatings, but listed to meet similar low-priced Hydrants offered by other makers.

All tested to 600 ft. head of water.

All Screwdown Hydrants open with a **left-hand** motion unless ordered otherwise.

For Dimensions see page 55.

Screwdown Fire Hydrants

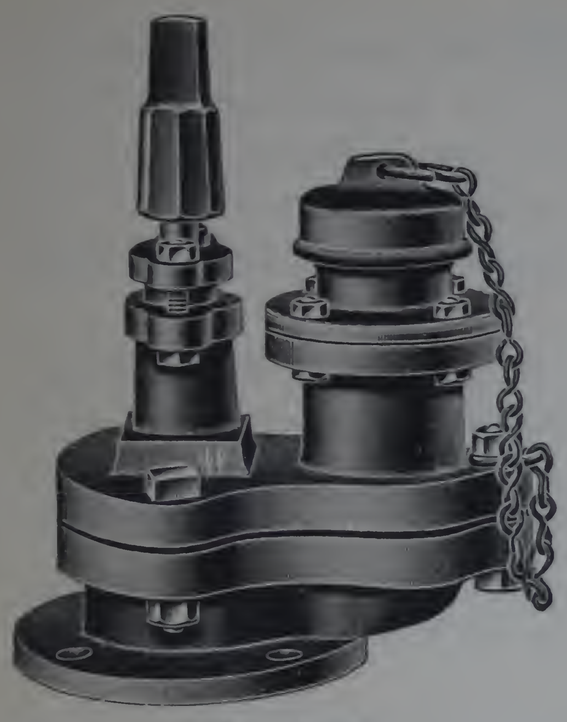


Fig. 2683.

Fig. 2683.—Loose Valve Screwdown Hydrant, similar in every respect to Fig. 2670, but with Round Outlet Flange.

PRICES.

Diameter of Inlet ...	2 in.	$2\frac{1}{2}$ in.	3 in.
Complete with Chained Cast-iron Cap to protect Outlet			
Ditto, but without Frost Plug			
*Ditto, but without Frost Plug and Gun-metal Valve Seating			

* Not recommended without Gun-metal Valve Seatings, but listed to meet similar low priced Hydrants offered by other makers.

For Dimensions see page 55.

Fig. 2675.—Screwdown Hydrant, similar in construction to Fig. 2660 (page 44), but fitted with Morris' Instantaneous Outlet in lieu of Screwed Outlet.

PRICES

Diameter of Inlet ...	$2\frac{1}{2}$ in.	3 in.	4 in.
Fig. 2675.—As illustrated, with Frost Valve and Water Guide, and with Chained Cast-iron Loose cap to protect Outlet			
,, ,, Ditto, but with Frost Valve only			
,, ,, Ditto, but with Water Guide only ...			
,, ,, Ditto, but without Frost Valve and Water Guide			

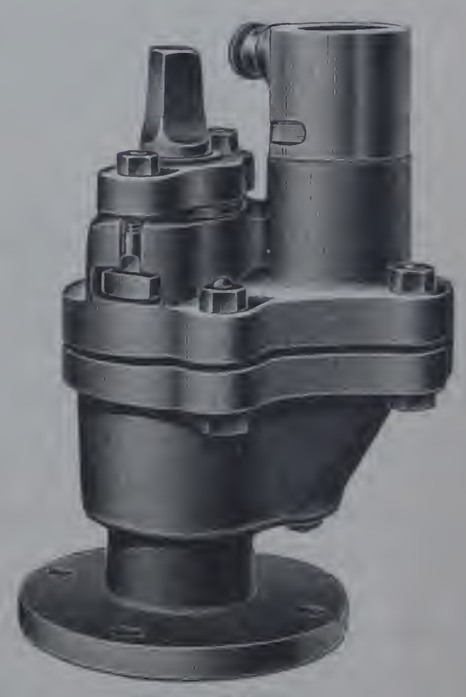


Fig. 2675.

This Hydrant is supplied, if required, with Stuffing Box for Ordinary Hemp Packing in lieu of Frictionless Packing.

All tested to 600-ft. head of water.

All Screwdown Hydrants open with a **left-hand** motion unless ordered otherwise.

For Dimensions see page 52.

Fire Hydrants with Telescopic Outlet

Fig. 2690.

All Sluice Valve Hydrants open with a **right-hand** *motion unless ordered otherwise.*

Fig. 2690.—Sluice Valve Fire Hydrant with Telescopic Outlet, consisting of Heavy Pattern Double Flanged Sluice Valve, having four Gun-metal Faces, Forged Bronze Spindle and Gun-metal Nut, Socket bolted on Inlet, Duckfoot Bend with Gun-metal Telescopic Revolving Outlet, and fitted with Gun-metal Automatic Frost Valve.

This type of Hydrant obviates the necessity of using Standpipes, thus providing for a much quicker attachment of Hose and consequently quicker application of the water to where required. When not in use the Telescopic Outlet slides down inside the Bend. A Gun-metal Frost Cock with T handle is supplied, if desired, in lieu of the Gun-metal Automatic Frost Valve.

Diameter of Inlet ... ... Inches	$2\frac{1}{2}$	3
Overall Height when closed ... Inches	23	$24\frac{1}{2}$
Fig. 2690, as illustrated		
Fig. 2689, ditto, but with Screwed Outlet		
Suitable Surface Box ... ... Fig.	9093	9093

Fig. 2691.—Screwdown Hydrant with Telescopic Outlet, Automatic Frost Valve, Frictionless Packing and Water Guide. The Spindle is of Forged Bronze, and the Valve, Water Guide, Valve Seat, Valve Guides, Telescopic Outlet, Frost Valve, Gland Bush and Bush in Cover are of Gun-metal. With the exception of the Outlet this Hydrant is similar in construction to Fig. 2660.

Diameter of Inlet ... ... Inches	$2\frac{1}{2}$	3
Overall Height when closed ... ... Inches	15	16
Fig. 2691, as illustrated		
Fig. 2692, ditto, but with Screwed Outlet		
Suitable Surface Box ... ... Fig.	9093	9093

If fitted with Double Telescopic Revolving Outlets, one Outlet being provided with Cap.

Morris' Outlet, extra; Screwed Outlet, extra.

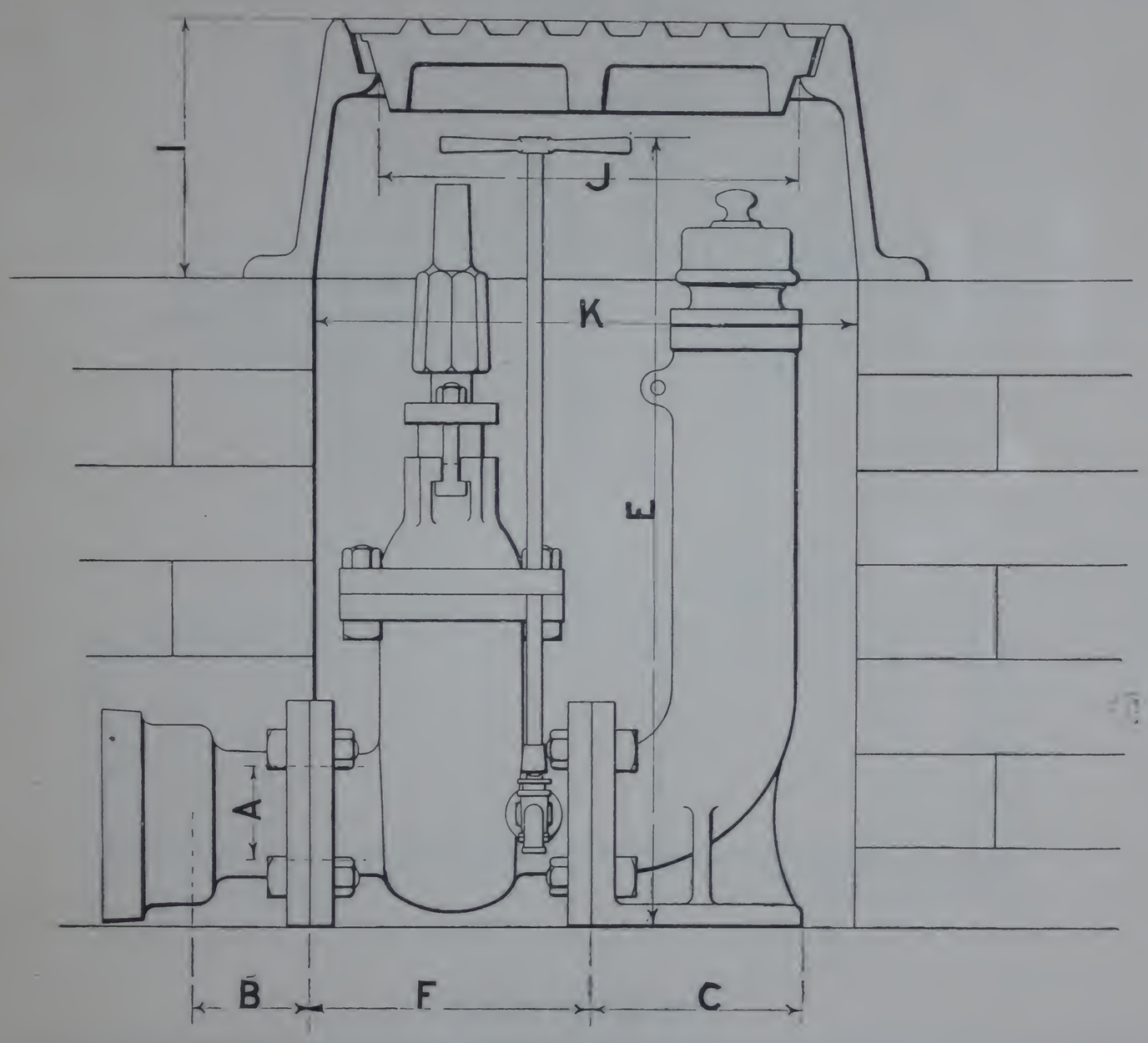
Fig. 2691.

All Screwdown Hydrants open with a **left-hand** *motion unless ordered otherwise.*

All tested to 600 ft. head of water.

Sluice Valve Fire Hydrants

Fig. 2650.



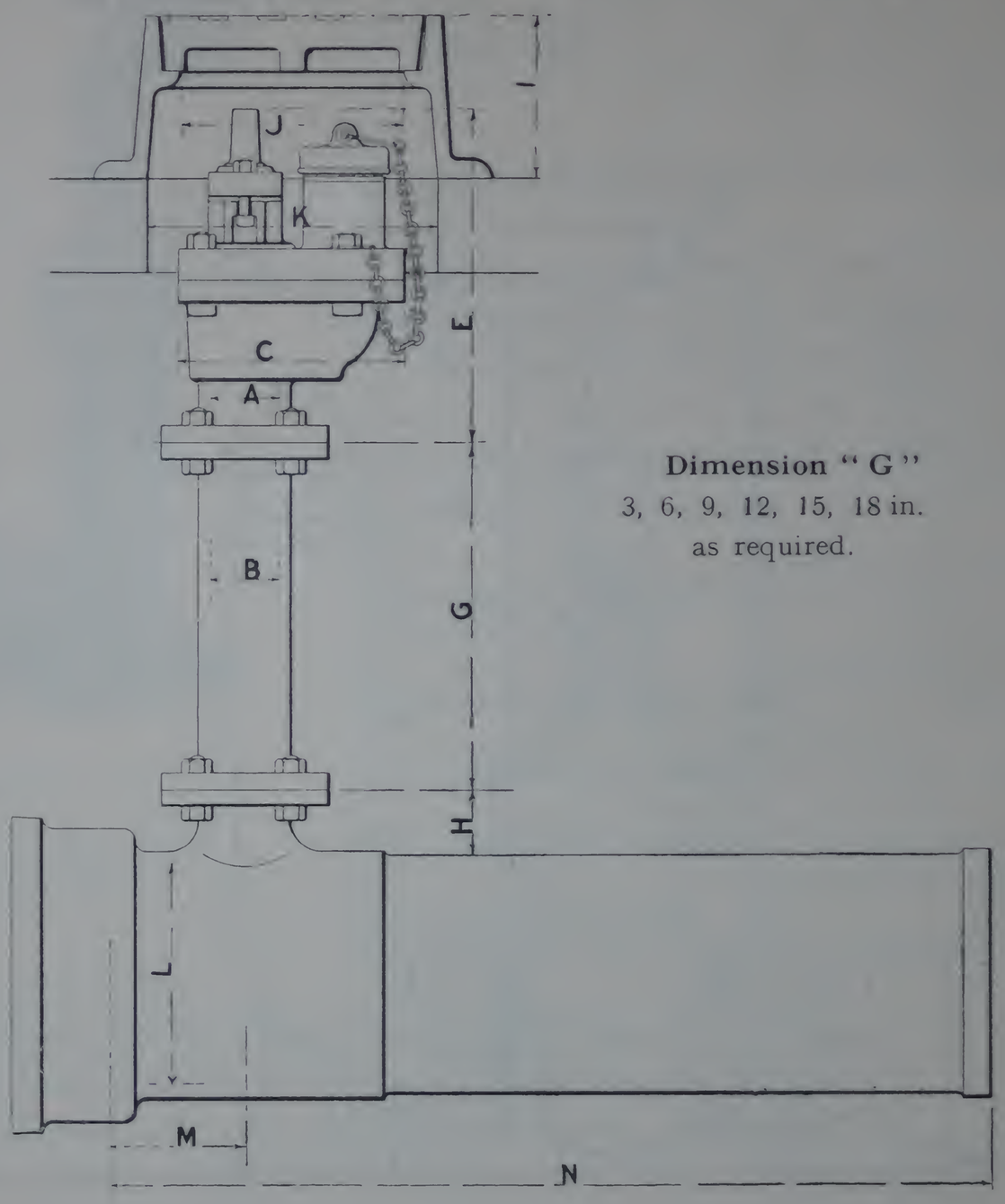
Dimensions in Inches.

A	B	C	E	F	I	J	K	Surface Box Fig.
$2\frac{1}{2}$	$3\frac{1}{2}$	6	24	$8\frac{1}{2}$	8	$18\frac{1}{4}\times 9\frac{1}{4}$	21×12	9116
3	$3\frac{3}{4}$	7	25	9	8	$18\frac{1}{4}\times 9\frac{1}{4}$	21×12	9116

The above particulars also apply to Fig. 2651.

Screwdown Fire Hydrants

Fig. 2660.



Dimension " G "
3, 6, 9, 12, 15, 18 in.
as required.

Dimensions in Inches.

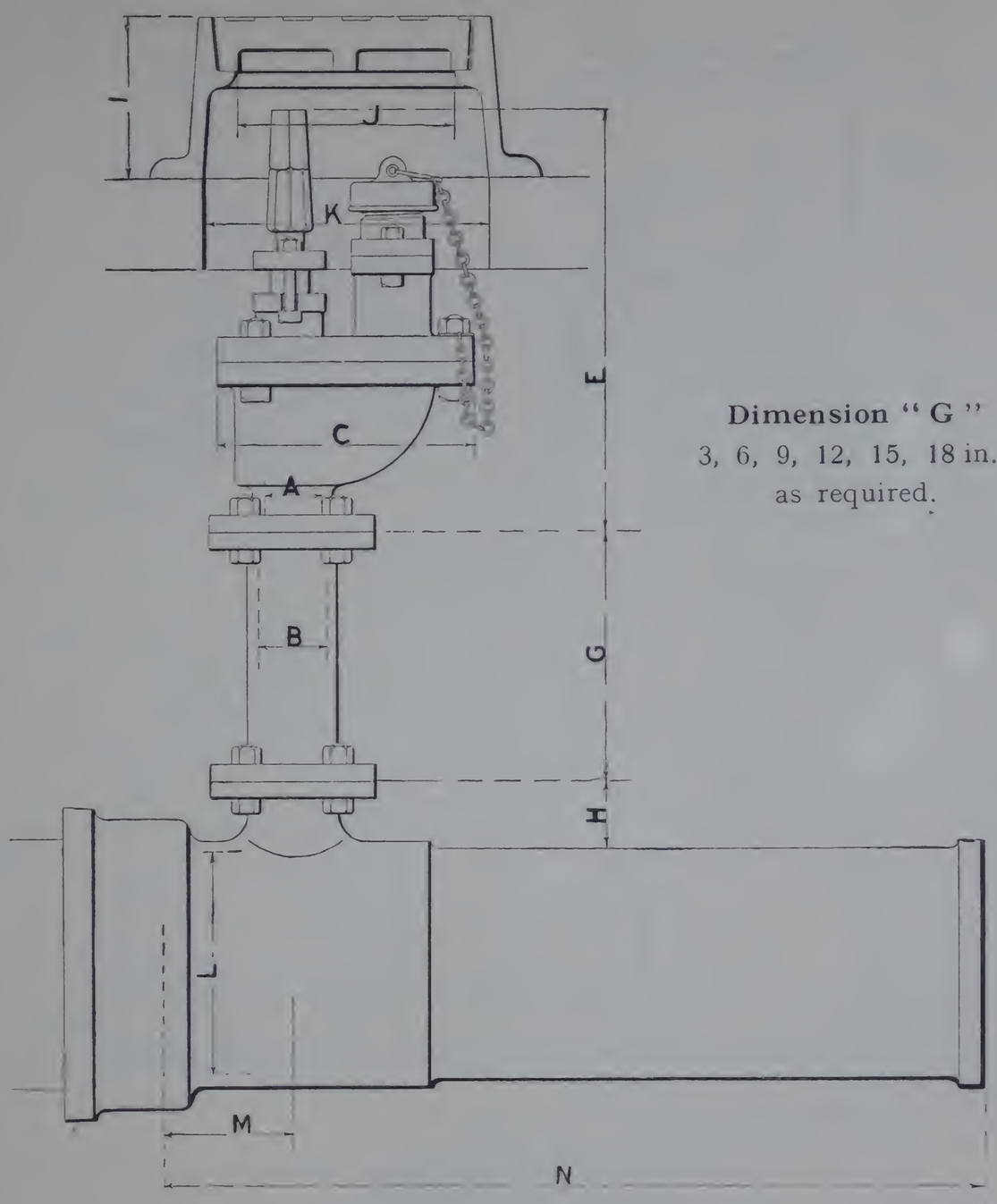
A	B	C	E	G	H	I	J	K	Surface Box Fig.	Diam. of Flanges	Crs. of Bolts	No. & size of Bolts
$2\frac{1}{2}$	3	$9\frac{3}{4}\times7\frac{1}{2}$	14	See Note Above	$4\frac{1}{2}$	7	$9\frac{1}{2}\times6$	$12\frac{1}{2}\times9$	9060	8	$6\frac{1}{2}$	4—$\frac{5}{8}$
3	3	10×8	$14\frac{1}{2}$		$4\frac{1}{2}$	7	$9\frac{1}{2}\times6$	$12\frac{1}{2}\times9$	9060	8	$6\frac{1}{2}$	4—$\frac{5}{8}$

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

The above particulars also apply to Figs. 2661 and 2675.

Screwdown Fire Hydrants

Fig. 2662.



Dimension "G"
3, 6, 9, 12, 15, 18 in.
as required.

Dimensions in Inches.

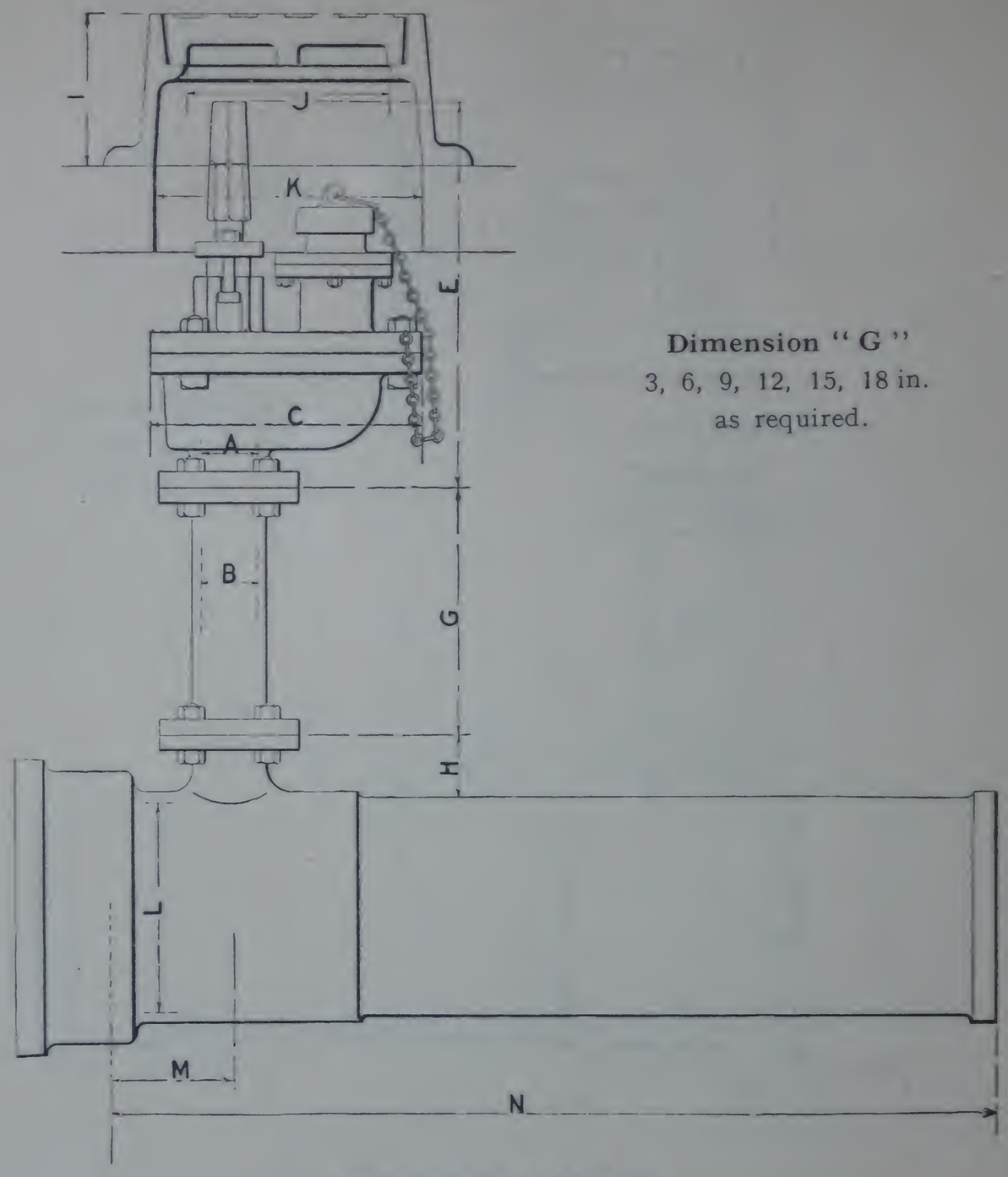
A	B	C	E	G	H	I	J	K	Surface Box Fig.	Diam. of Flanges	Crs. of Holes	No. & size of Bolts
$2\frac{1}{2}$	3	11×8	19	See Note Above	$4\frac{1}{2}$	7	$9\frac{1}{2}\times6$	$12\frac{1}{2}\times9$	9060	8	$6\frac{1}{2}$	$4—\frac{5}{8}$
3	3	11×8	19		$4\frac{1}{2}$	7	$9\frac{1}{2}\times6$	$12\frac{1}{2}\times9$	9060	8	$6\frac{1}{2}$	$4—\frac{5}{8}$

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

The above particulars also apply to Fig. 2663.

Screwdown Fire Hydrants

Figs. 2664 and 2667.



Dimension " G "
3, 6, 9, 12, 15, 18 in.
as required.

Dimensions in Inches.

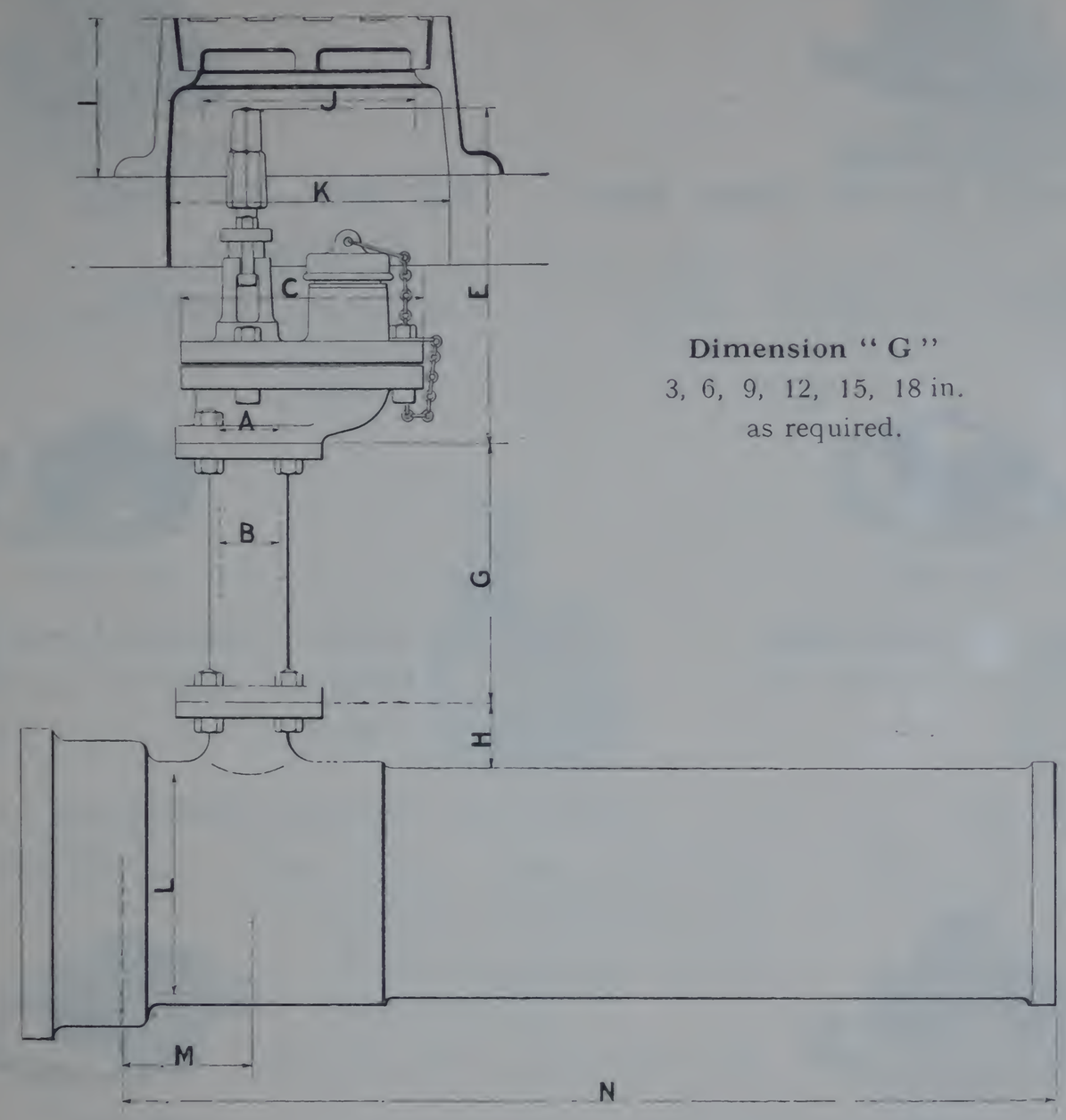
A	B	C	E	G	H	I	J	K	Surface Box Fig.	Diam. of Flanges	Crs. of Holes	No. & size of Bolts
$2\frac{1}{2}$	3	11×8	19	See Note Above	$4\frac{1}{2}$	7	$9\frac{1}{2}\times6$	$12\frac{1}{2}\times9$	9060	8	$6\frac{1}{2}$	4—$\frac{5}{8}$
3	3	11×8	19		$4\frac{1}{2}$	7	$9\frac{1}{2}\times6$	$12\frac{1}{2}\times9$	9060	8	$6\frac{1}{2}$	4—$\frac{5}{8}$

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

The above particulars also apply to Figs. 2665, 2666, 2668 and 2669.

Screwdown Fire Hydrants

Fig. 2670.



Dimension " G "
3, 6, 9, 12, 15, 18 in.
as required.

Dimensions in Inches.

A	B	C	E	G	H	I	J	K	Surface Box Fig.	Diam. of Flanges	Crs. of Holes	No. & size of Bolts
2	3	$10\frac{1}{2}\times7\frac{1}{2}$	$14\frac{1}{2}$	See Note Above	$4\frac{1}{2}$	7	$9\frac{1}{2}\times6$	$12\frac{1}{2}\times9$	9060	8	$6\frac{1}{2}$	$4-\frac{5}{8}$
$2\frac{1}{2}$	3	$10\frac{1}{2}\times7\frac{1}{2}$	$14\frac{1}{2}$		$4\frac{1}{2}$	7	$9\frac{1}{2}\times6$	$12\frac{1}{2}\times9$	9060	8	$6\frac{1}{2}$	$4-\frac{5}{8}$

L	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
M	5	5	5	6	6	6	6	6	6	7	7	7	7	8	8	8	8
N	36	36	36	36	36	42	42	42	42	48	48	48	54	54	54	60	60

The above particulars also apply to Figs. 2671 and 2683.

Outlet Pieces, Outlet Caps, etc., for Hydrants

Fig. 2696.

Fig. 2696.—Gun-metal Screwed Outlet Piece, for Hydrants.

PRICE, each.

Fig. 2697.

Fig. 2697.—Gun-metal Screwed Outlet Piece, for Hydrants.

PRICE, each.

Fig. 2698.

Fig. 2698.—Cast-iron Cap with Chain, for Hydrants having Bayonet Lug Outlets ... ... each

Cap only, without Chain ... ... each

Fig. 2699.

Fig. 2699.—Cast-iron Loose Cap with Chain, for Hydrants having Screwed Outlets ... ... each

Cap only, without Chain ... ... each

Fig. 2700.

Fig. 2700.—Cast-iron Screwed Cap with Chain, for Hydrants having Screwed Outlets ... ... each

Cap only, without Chain ... ... each

Fig. 2701.

Fig. 2701.—Gun-metal Screwed Cap with Chain, for Hydrants having Screwed Outlets ... ... each

Cap only, without Chain ... ... each

Fig. 2702.

Fig. 2702.—Gun-metal Converting Connector, for altering the Screwed Outlets of Fire Hydrants to Bayonet Lug Outlets.

PRICE, each.

Outlet Pieces, Outlet Caps, etc., for Hydrants

Fig. 2704.

Fig. 2704.—Morris' Gun-metal Instantaneous Outlet Piece, with Cap and Chain and Flanged Connection to suit Hydrant, Pipe, or Fire Engine.

Size ... ... $2\frac{1}{2}$ in. $2\frac{3}{4}$ in.

Fig. 2705.

Fig. 2705.—Morris' Gun-metal Instantaneous Outlet Piece, with Cap and Chain and Oval Flange to suit Hydrant, Pipe, or Fire Engine.

Size ... ... $2\frac{1}{2}$ in. $2\frac{3}{4}$ in.

Fig. 2706.

Fig. 2706.—Gun-metal Blank Cap and Chain for Morris' Outlet.

Size ... $2\frac{1}{2}$ in. $2\frac{3}{4}$ in.

Fig. 2707.

Fig. 2707. — Gun-metal Converting Connector, for altering the Screwed Outlets of Fire Apparatus to suit Morris' system.

Size 2 in. $2\frac{1}{4}$ in. $2\frac{1}{2}$ in. $2\frac{3}{4}$ in. 3 in.

Fig. 2708.

Fig. 2708.—Gun-metal Blank Cap, with Tee-handle Vent and Chain for Morris' Outlet.

Size ... $2\frac{1}{2}$ in. $2\frac{3}{4}$ in.

Fig. 2709.

Fig. 2709.—Gun-metal Converting Connector for altering the Screwed Outlets of Fire Hydrants to suit No. 3 Nunan's Couplings.

PRICE, each.

Fig. 2710.

Fig. 2710.—Nunan's No. 3 Gun-metal Outlet Piece for Hydrants.

PRICE, each.

Fig. 2711.

Fig. 2711.—Gun-metal Blank Cap and Chain for No. 3 Nunan's Outlet.

PRICE, each.

Ball Hydrants, etc.

Bateman & Moore's Ball Hydrant.

each.

Fig. 2746.—Ditto, standard size, Ball 3 in. dia. ... ...

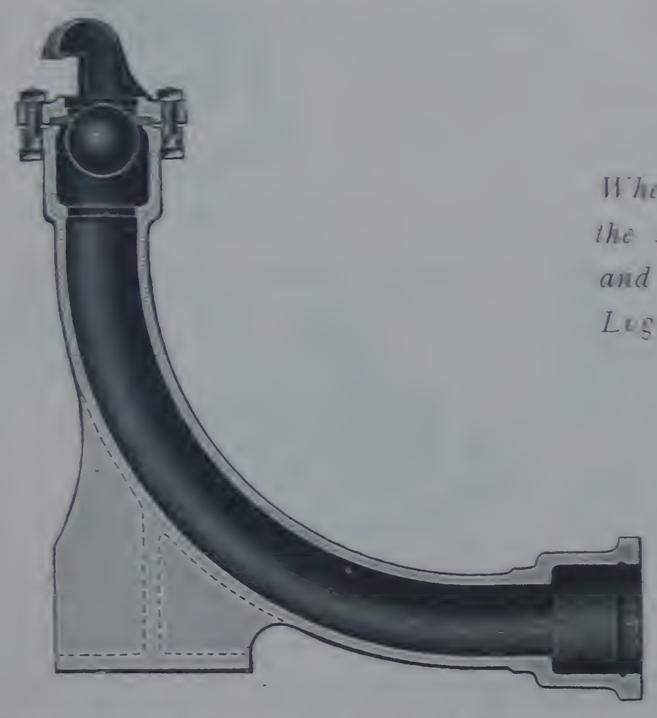
Fig. 2747.—Ditto, large size, Ball $3\frac{7}{8}$ in. dia. Extra for Gun-metal Outlet Seating ...

Bateman & Moore's "Fullway" Ball Hydrant with Rest for Ball.

each.

Fig. 2750.—Complete with Cap, standard size, Ball 3 in. dia. ... ...

Fig. 2751.—Ditto, large size, Ball $3\frac{7}{8}$ in. dia. Extra for Gun-metal Outlet Seating ...



Bateman & Moore's Ball Hydrant with Long Socket Elbow.

Bore of Elbow ... 3 in. 4 in.

Fig. 2754.—Complete with Cap, standard size, Ball 3 in. dia.

Fig. 2755.—Complete with Cap, large size, Ball $3\frac{7}{8}$ in. dia. Extra for Gun-metal Outlet Seating ... ... each

When ordering Ball Hydrants, the size of the Outlet Aperture and the distance between the Lugs should be given.

Bateman & Moore's Ball Hydrant with Short Socket Elbow.

Bore of Elbow ... 2 in. $2\frac{1}{2}$ in. 3 in. 4 in.

Fig. 2759. — Complete with Cap, standard size, Ball 3 in. dia. ... ...

Fig. 2760. — Complete with Cap, large size, Ball $3\frac{7}{8}$ in. dia. ... ... Extra for Gun-metal Outlet Seating, each.

All tested to 600 ft. head of water.

MISCELLANEOUS PRICES

Best Ebonite Ball, 3 in. dia., for standard size Ball Hydrants ... ... each.
Leather and Rubber Rings for Ball Hydrants ... ... per pair.
Attaching Hydrants to Tees, Bends, or Lengthening Pieces, with Bolts, Nuts and Joint, including testing after being connected ... ... each.

For Size of Standard Flanges, see pages 54 & 55.

Accessories for Sluice Valves and Hydrants

T Key for operating Sluice Valves, Hydrants, etc.

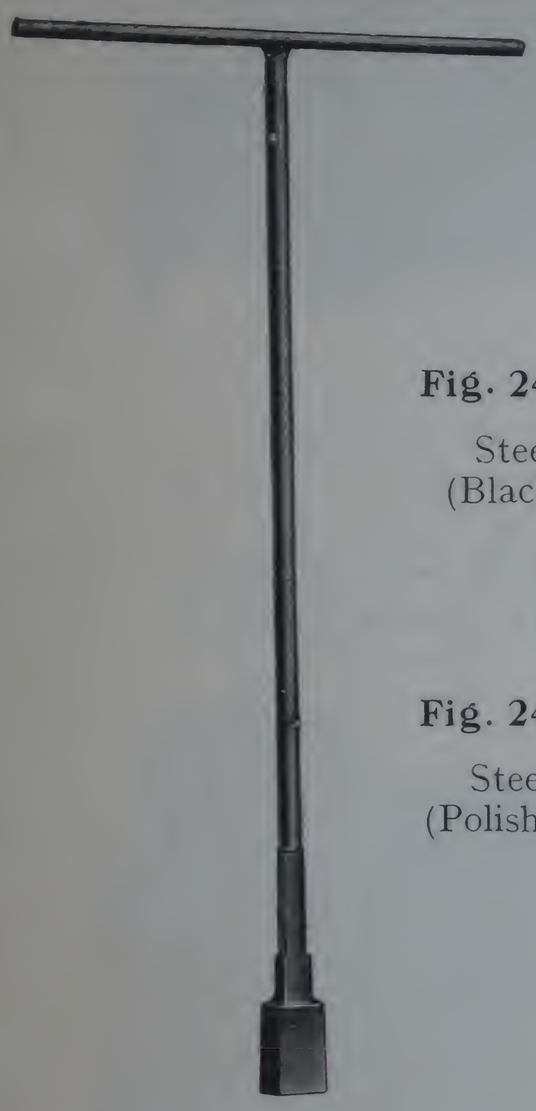


Fig. 2488.
Steel
(Black).

Fig. 2489.
Steel
(Polished).

Fig. 2720.
Scouring Key for Ball Hydrants.
PRICE,

Key with Loose Poker for Operating Sluice Valves, Hydrants, etc.

Fig. 2490.
Steel
(Black).

Fig. 2491.
Steel
(Polished).

Fig. 2721.—A simple attachment for Ball Hydrants, which prevents dirt, etc., gaining access to Water Mains.

PRICE, each.

Fig. 2724.—Ball Hydrant Top.

Small size	...	each.
Standard size	...	,,
Large size	...	,,
Extra for Gun-metal Outlet Seating	...	,,

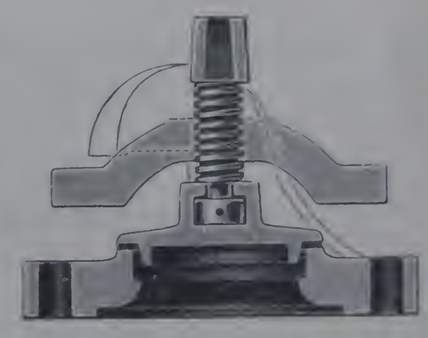


Fig. 2722.— Screw - down Valve, to close Ball Hydrant so as to prevent leakage until convenient to repair a defective Ball.

PRICE, each.

"Blakeborough" Patent Reflux Valves

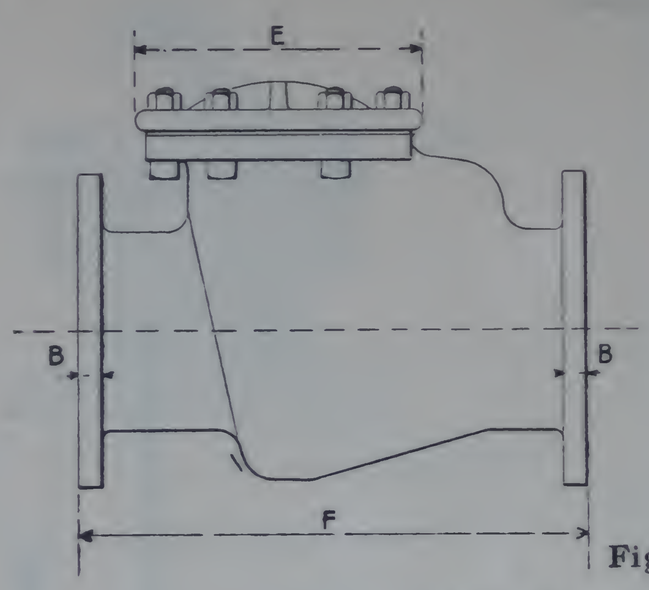


Fig. 3042.

Type for all sizes up to 12 in. bore.

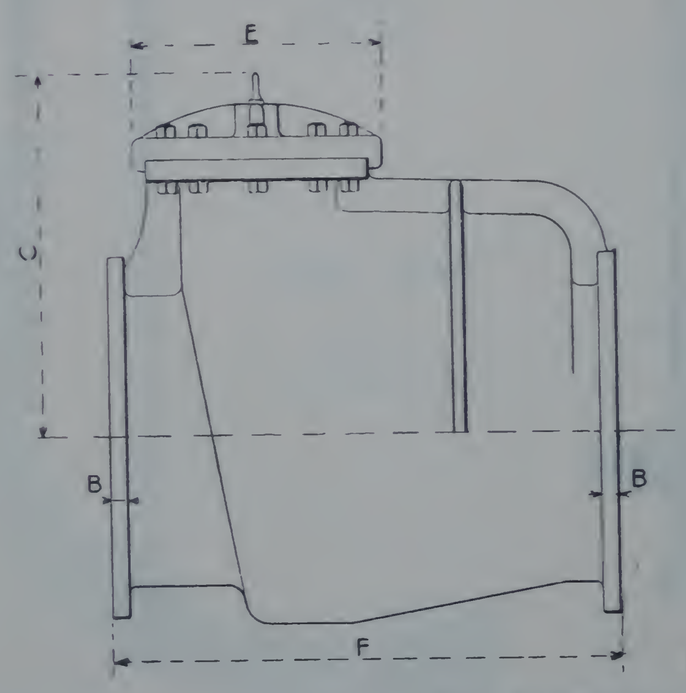


Fig. 3043.

Type for all sizes above 12 in. bore.

Dimensions in Inches.

Size ...	2	2½	3	4	5	6	7	8	9	10	12	14	15	16	18	20	21	22	24
A	6	6½	7¼	8½	10	11	12	13¼	14½	16	18	20¾	21¾	22¾	25¼	27¾	29	30	32½
B	¾	¾	¾	⅞	⅞	⅞	1	1	1	1	1⅛	1¼	1¼	1¼	1⅜	1½	1½	1½	1⅝
C	4⅞	4⅞	5⅜	6½	8	8¾	10⅜	11¼	12	12¾	18¾	20	20¾	21¼	27½	29	29	33	33
D	7⅝	8⅛	8¾	9⅞	12⅜	13½	15¼	16½	18¼	19½	22½	27	28¾	29¾	29½	33	33	39½	39½
E	6¾	7⅛	7⅝	8	9¾	10⅜	11¼	11½	12	13	16¼	18¾	16½	16¼	20	18	18	22⅝	22⅝
F	12	12	12	14	16	17½	19	21	23	25	30	34	34	34	37½	40	40	42	46

For particulars of drilling see page 75.

"Blakeborough" Patent Reflux Valves

Patent No. 2254/1914.

Fig. 3042.

Type for all sizes up to 12 in. Bore. Sizes up to and including 6 in. have solid Gun-metal Door.

Fig. 3043.

Type for all sizes above 12 in. Bore.

Figs. 3042 and 3043.—Patent Single Door Reflux or Retaining Valves.

The novel feature of this Valve is the Hinge. The Flap, being suspended from the centre by the Hinge instead of from the top in the usual manner, is free to find its seat by the action of the water itself.

A further advantage is the accessibility of the working parts, which may be entirely withdrawn for inspection with the greatest ease.

Gun-metal Stop Ferrules

Fig. 3301.

Fig. 3303.

Fig. 3306.

Fig. 3310.

Fig. 3301.—Metropolitan Water Board Pattern Screwdown Stop Ferrule, with Gun-metal Body, Leather-faced Valve, and Union for Lead Pipe.

PRICES PER DOZEN.

Size in Inches ...	½	¾	1	1¼	1½
Price					

Fig. 3303.—Screwdown Stop Ferrule, with Gun-metal Body, Leather-faced Valve and Union for Lead Pipe.

Fig. 3304.—Ditto, but with Screwed " F " Outlet for Iron Pipe.

PRICES PER DOZEN.

Size in Inches ...	⅜	½	⅝	¾	1	1¼	1½	2
Fig. 3303 ...								
Fig. 3304 ...								

Fig. 3306.—Screwdown Stop Ferrule, as Fig. 3303, but with short neck.

Fig. 3307.—Ditto, as Fig. 3304, but with short neck.

PRICES PER DOZEN.

Size in Inches ...	⅜	½	⅝	¾	1	1¼	1½	2
Fig. 3306 ...								
Fig. 3307 ...								

Fig. 3310.—Ferrule Stop Cock, consisting of a Ground Plug Cock and Ferrule combined and having Union for Lead Pipe.

PRICES PER DOZEN.

Size in Inches ...	⅜	½	⅝	¾	1	1¼	1½	2
Price								

All tested to 300 lbs. per sq. inch.

Gun-metal Stop Taps

Fig. 3315.

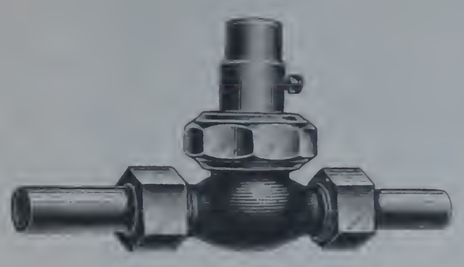


Fig. 3320.

Fig. 3316.

Fig. 3315.—" Blakeborough " Gun-metal Stop Tap, with Plain Ends for Lead Pipe.

Fig. 3316.—" Blakeborough " Gun-metal Stop Tap, with Screwed " F " Ends for Iron Pipe.

Size in Inches ...	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Fig. 3315							
Fig. 3316							

The above Fittings are priced in Gun-metal. We do not make the cheaper variety in Hard Brass.

These Taps may be fitted with either Hexagon Glands or with Glands milled on edge, but unless otherwise ordered we supply with Glands milled on edge.

Fig. 3320.—Metropolitan Water Board Pattern Screwdown Stop Taps, with Gun-metal Body, Metallic Seating, and Unions for Lead Pipes.

Size in Inches ...	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Price					

All tested to 300 lbs. per sq. inch.

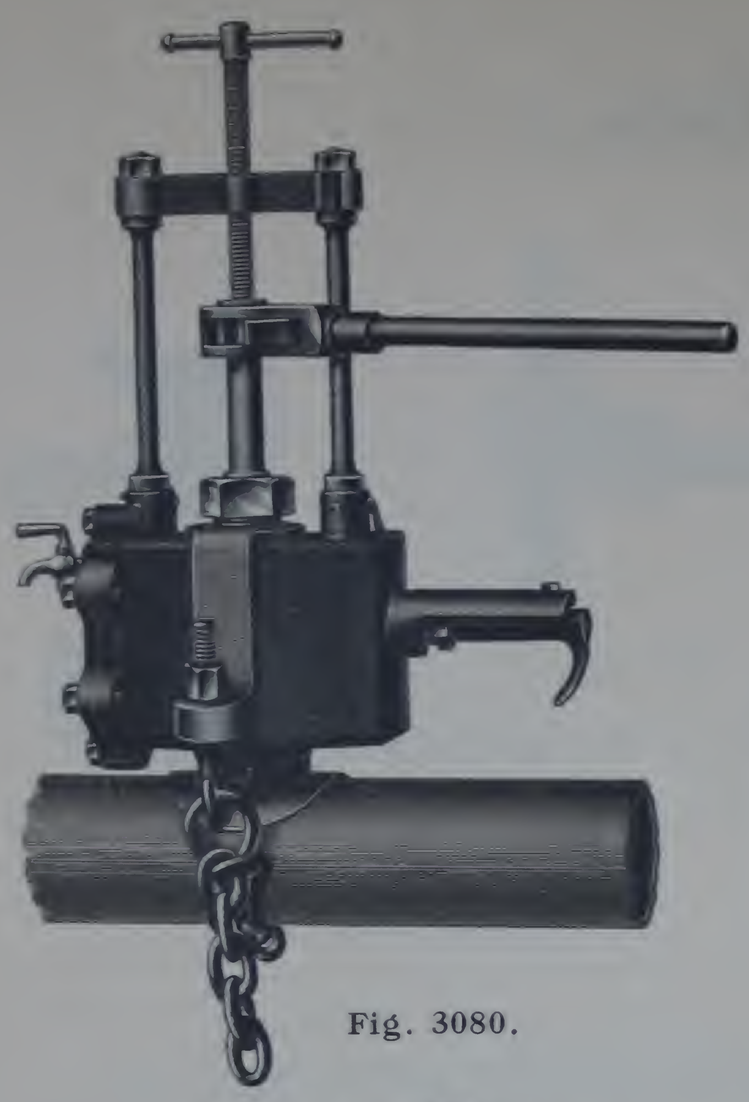


Fig. 3080.

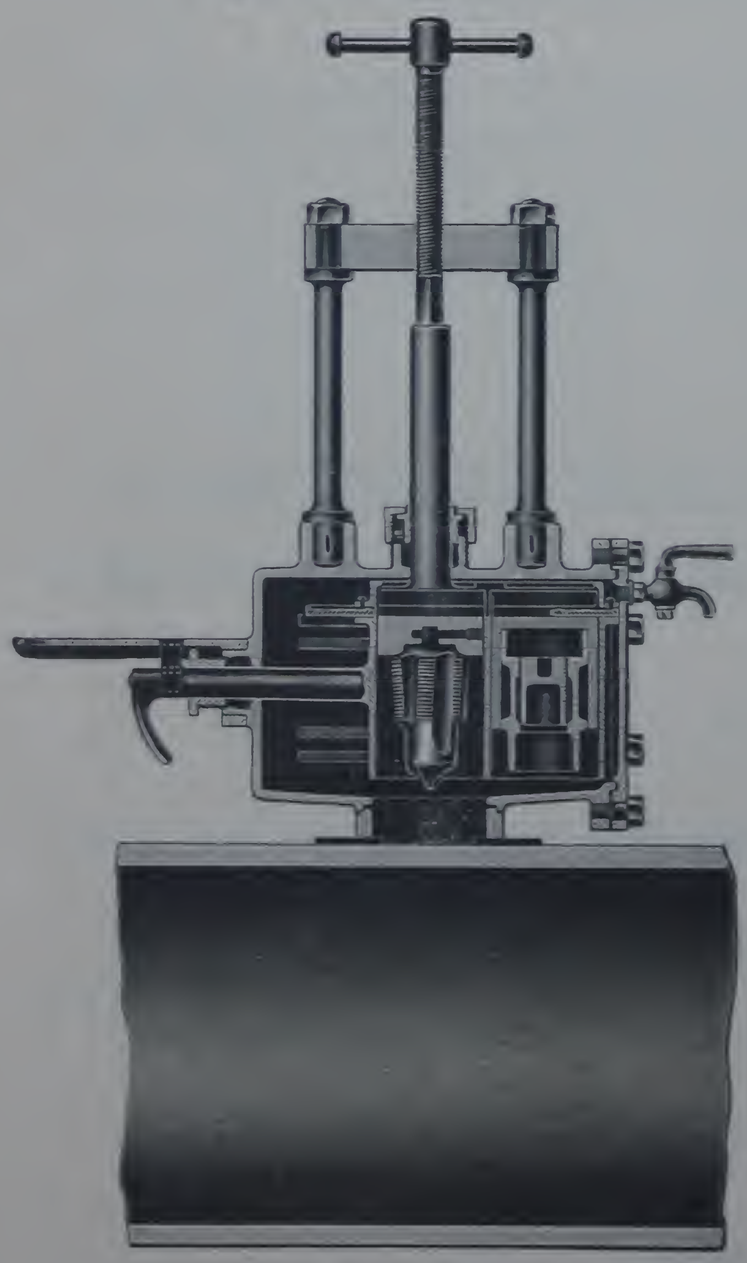


Fig. 3080.

Boyd's Patent Drilling and Tapping Apparatus

For inserting Ferrules in Water Mains UNDER PRESSURE

This Machine not only overcomes the defects which have hitherto been associated with this class of tool, but in addition has the important advantage of being much simpler, much lighter, and more convenient than any other on the market.

With competing machines the operator has either to shut a valve, afterwards removing the top of the machine for inserting the ferrule ; or in other machines to revolve the top of the machine 180 degrees in order to bring the ferrule into position for insertion. With either type of competing machines the pressure of the water produces friction which interferes with operating it ; with Boyd's Patent the pressure of the water assists the operator, notably, after drilling, by moving the sliding carriage into position for inserting the ferrule.

Stability of the operating tool—a most important consideration in order to ensure correct alignment—is secured in Boyd's Patent by the novel internal arrangement (see Fig. 3080), which allows considerable support and guidance to be given to the moving parts, and this as near as possible to the work to be done.

The Drill and Ferrule Holders are held in their topmost position in the Carrier by means of Sliding Tongues, and they may by a simple movement each in turn be taken out for the purpose respectively of altering the size of drill or substituting a Ferrule Holder of another size.

Another marked improvement is the adoption of Indicators to the Sliding Carrier and Tapping Spindle, which enable the operator to have intelligent control of the various motions.

The Main can be drilled and tapped and a ½-in. Ferrule inserted in less than ten minutes.

Boyd's Patent Drilling and Tapping Apparatus

For inserting Ferrules in Water Mains UNDER PRESSURE.

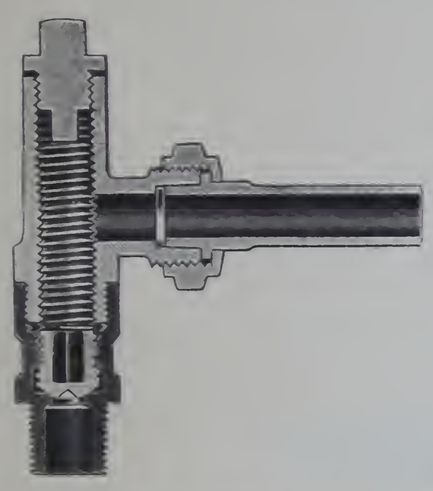


Fig. 3084.
With Union for Lead Pipe.

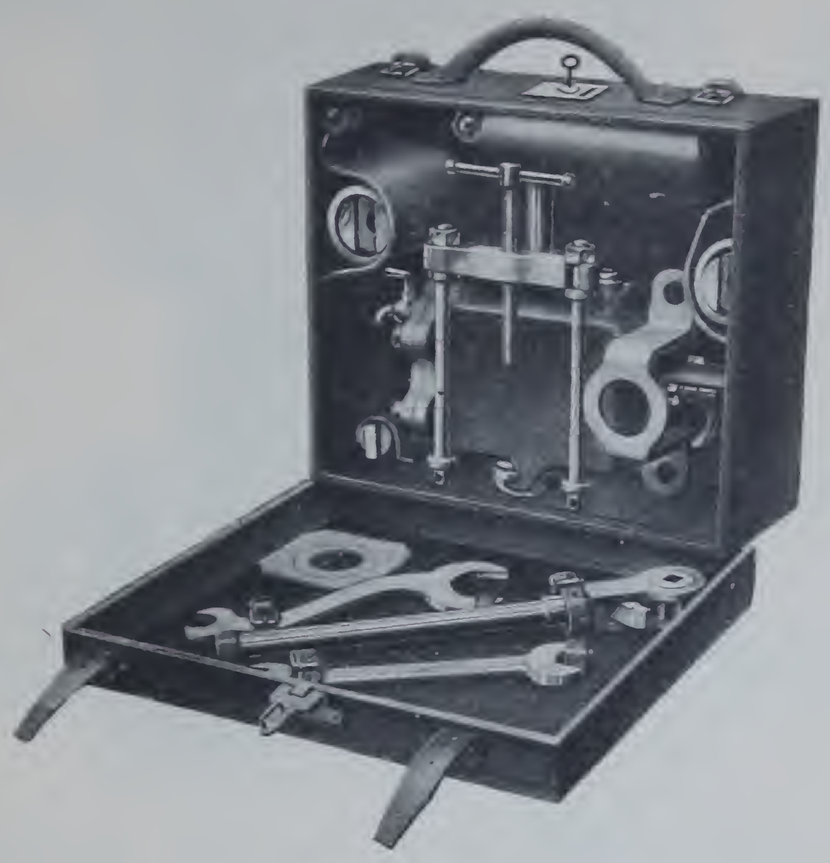


Fig. 3081.

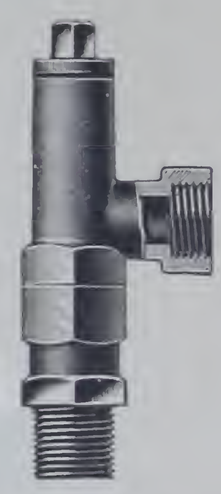


Fig. 3085.
With F Outlet for Iron.

SPECIFICATION.

Fig. 3080.—Size **No. 1 Machine,** having Gun-metal Body, with G.M. Test Cock, Polished Steel Spindle, Pillars, Crosshead and Feed-Screw, combined Drills and Taps for $\frac{1}{2}$-in., $\frac{3}{4}$-in. and 1-in. Ferrules ; three Ferrule-Holders ; Gun-metal Saddles for 3-in., 4-in., 5-in., 6-in., 7-in., 8-in., 9-in., 10-in. and 12-in. pipes ; Ratchet Brace, two Spanners, Binding Chain and Rubber Joint Rings ; complete, in Portable Wood Case, with Lock and two Keys ... ...

Fig. 3081.—Size **No. 1 ditto,** ditto, in strong Leather Hand Bag, with Lock and two Keys

Fig. 3082.—Size **No. 2 Machine,** as above, but with combined Drills and Taps for $\frac{1}{2}$-in., $\frac{3}{4}$-in., 1-in., $1\frac{1}{4}$-in. and $1\frac{1}{2}$-in. Ferrules ; five Ferrule-Holders ; and Gun-metal Saddles for 6-in., 7-in., 8-in., 9-in., 10-in., 12-in., 15-in., 18-in. and 20-in. Mains ; in Portable Wood Case, with Lock and two Keys ...

EXTRA DRILL AND TAP (Combined).

Size in inches ...	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Price, each					

Broadhead's Patent Pressure Reducing Valve

Fig. 3054.

Fig. 3054.—Broadhead's Patent Pressure Reducing Valve. The unique feature of this Valve is the arrangement of tandem regulating Valves controlled by the weighted lever and by the reduced pressure acting on the Piston at the Outlet side.

Briefly stated, the new principle which is embodied consists in the Valve being closed by the Inlet pressure, the admission of the Inlet Pressure being controlled by the pressure on the Outlet side.

This arrangement permits of the combination of accurate and reliable performance with simple and durable design, together with the following advantages :—

1. Variation of pressure on Inlet side does not affect the reduced pressure on the Outlet side.
2. No creeping up of pressure is possible on the Outlet side, as the Valve is absolutely tight after the reduced pressure is attained.
3. The reduced pressure may be varied by alteration of weights.
4. There is no waste, all exhaust water being displaced into the Outlet side of the Valve.
5. No expensive bye-pass Pipes and Valves required. In the event of fire, by merely lifting the handle controlling the two small Cocks, the full pressure is available.

PRICES.

Sizes in inches	2	2½	3	4	5	6	7	8	9	10	12	15
Fig. 3054. Complete, as illustrated												
Extra, if with Spigot and Socket Ends bolted on..												

When ordering, please state the initial or full pressure and the maximum reduced pressure required. Prices apply to Valves for initial pressures not exceeding 150 *lbs. per square inch.*

Made in all sizes. **Prices for Heavier Pressures on Application.**

Reducing or Break-Pressure Tank

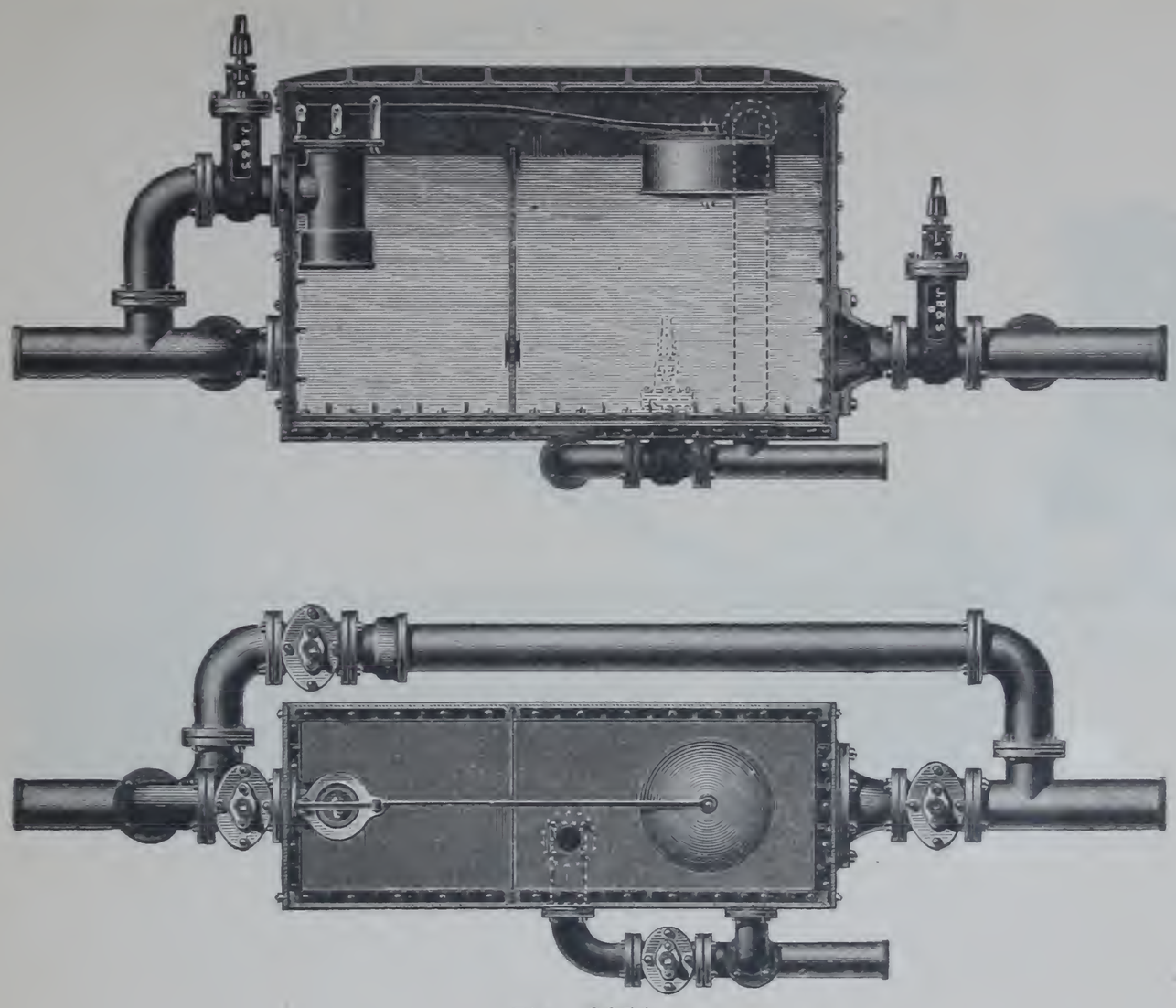


Fig. 3056.

Fig. 3056.—Break-Pressure Tank, suitable for fixing in a line of main for the purpose of reducing or breaking the pressure.

In this arrangement the pressure is reduced to nil at the point where the Tank is installed.

The Inlet, Outlet, Washout and Bye-pass are fitted with Heavy Pattern Sluice Valves, Equilibrium Float Valve (Fig. 3071) at the Inlet, and Bellmouth Pipe at the Outlet.

The Tank is composed of Cast Iron Plates bolted together and provided with a Perforated Baffle Plate. The Ball floats on the Outlet side of the Baffle Plate, thus preventing undue oscillation of the Float by the rush of water into the Tank.

In the event of fire the full pressure is available through the Bye-pass provided for the purpose.

This apparatus can be made in all required sizes and acts very efficiently if constructed to proper proportions.

NOTE.—It is very important that these Tanks have as large an area as possible, so as to prevent sudden opening and closing of the Float Valve.

SIZES MADE.

Fig. 3056.	10 ft. 0 in. × 4 ft. 6 in. × 5 ft. 0 in. deep.	**Fig. 3061.**	6 ft. 3 in. × 2 ft. 7 in. × 4 ft. 3 in. deep.
Fig. 3057.	8 ft. 0 in. × 3 ft. 6 in. × 5 ft. 0 in. ,,	**Fig. 3062.**	5 ft. 6 in. × 2 ft. 0 in. × 2 ft. 9 in. ,,
Fig. 3058.	7 ft. 0 in. × 3 ft. 6 in. × 4 ft. 0 in. ,,	**Fig. 3063.**	5 ft. 0 in. × 2 ft. 0 in. × 3 ft. 6 in. ,,
Fig. 3059.	7 ft. 0 in. × 3 ft. 0 in. × 4 ft. 0 in. ,,	**Fig. 3064.**	4 ft. 0 in. × 2 ft. 0 in. × 3 ft. 0 in. ,,
Fig. 3060.	7 ft. 0 in. × 2 ft. 6 in. × 4 ft. 3 in. ,,		

Prices on receipt of Particulars.

Equilibrium Float Valve

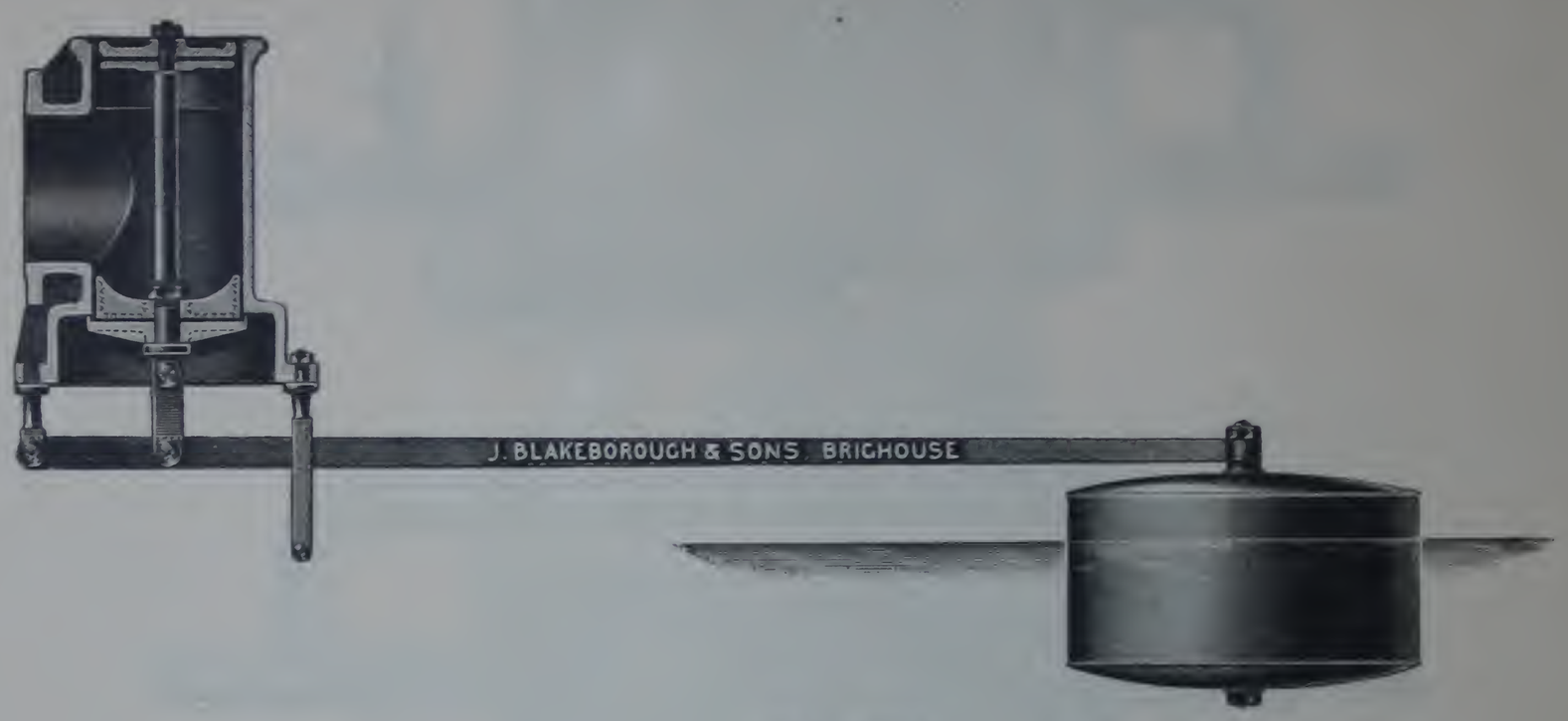


Fig. 3071.

Fig. 3071.—Equilibrium Float Valve, with Gun-metal Valve Seat, and Cylinder Lining, Copper Float, Wrought Iron Lever and Links with Bronze Pins.

Valves up to 5 in. diam. inclusive have solid Gun-metal Piston and Stopper.

The Valve is faced with Leather, and the Piston is fitted with Cup Leather Packing.

The Lever can be fitted at right angles to position shown if desired, or alternatively may be placed on the top of Valve similar to Fig. 3072.

Thousands of this type of Valve are fixed and giving every satisfaction.

PRICES.

Sizes in inches ...	2	2½	3	4	5	6	7	8	9	10	12

When making enquiries, or ordering, kindly state maximum pressure the Valve must close against.

Equilibrium Float Valve

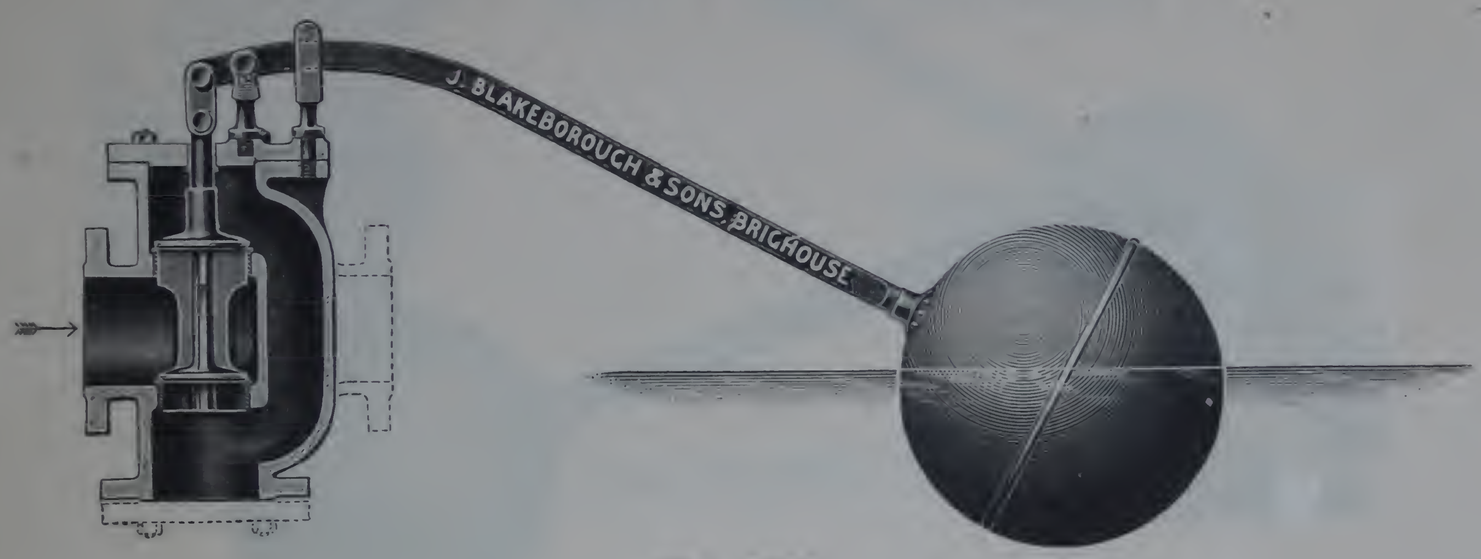


Fig. 3072.

Fig. 3072.—Equilibrium Ball Valve, Angle Pattern, with Gun-metal Valve, Valve Seats, Guide Bush, Copper Float, Wrought Iron Lever and Links with Bronze Pins.

The Valve being double beat a small variation in water level gives a large discharge from Valve.

The Lever can be fitted at right angles to the position shown if desired.

Fig. 3073.—Equilibrium Ball Valve, Straight pattern (as shown in dotted lines). The standard construction for this type of Valve is with Lever at right angles to waterway.

PRICES.

Sizes in inches ...	2	2½	3	4	5	6	7	8	9	10	12

When making enquiries, or ordering, kindly state maximum pressure the Valve must close against.

Equilibrium Float Valve

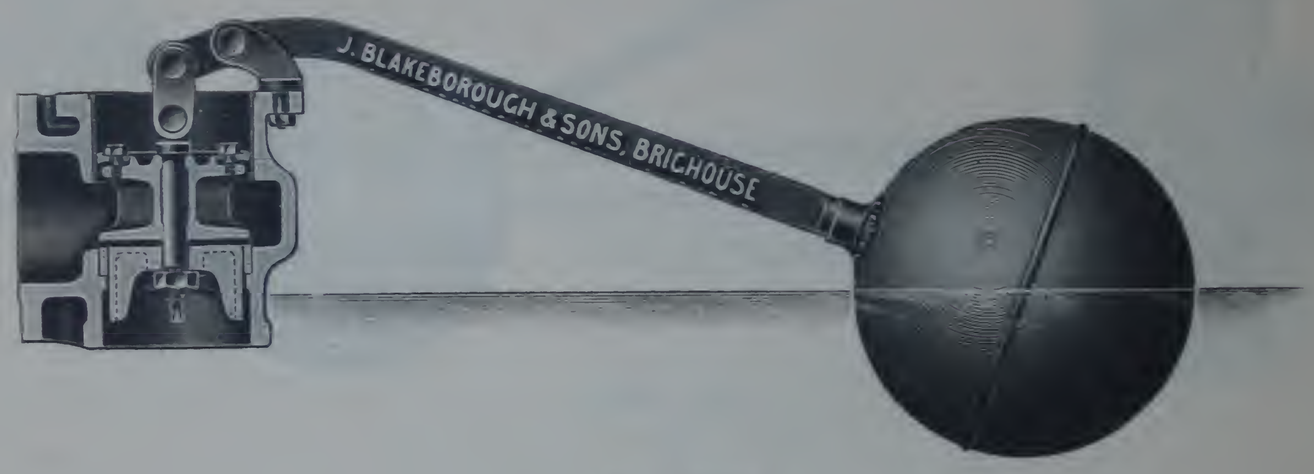


Fig. 3075.

Fig. 3075.—Equilibrium Ball Valve, with Gun-metal Valve Seat and Cylinder Lining, Copper Float, Wrought Iron Lever and Links with Bronze Pins.

Valves up to 5 in. diam. inclusive have solid Gun-metal Piston and Stopper.

The Valve is faced with Leather and the Piston is fitted with Cup Leather Packing.

The Lever can be fitted at right angles to the position shown if desired.

PRICES.

Sizes in inches ...	2	2¼	3	4	5	6	7	8	9	10	12

To facilitate quoting, enquiries should state maximum pressure the Valve must close against.

The "Pilot" Float Valve

Fig. 3077.

In this type of Float Valve the main valve is controlled by a small "Pilot" Valve, which, being relatively easy to operate, can be actuated by a much shorter level and smaller float. It is applicable to any variety of service—irrespective of pressure—and is specially suitable for use in a restricted space as the overall length is reduced approximately half. It is specially applicable also where it is desirable to maintain the highest possible water level, the valve being operated by approximately half the variation in water level required for a valve of the old type.

Cup leather packings have also been dispensed with, and the closing speed of the valve is capable of adjustment by means of the regulating screw which admits the inlet pressure.

The Float Lever is made in two parts connected by means of Gun-metal Serrated Discs, an arrangement rendering the Float easy of adjustment to the required water level.

The Valve is provided with Gun-metal Valve Seat and Cylinder Lining, Copper Float, Wrought Iron Lever, Links and Bronze Pins.

Valves up to 5 in. diameter inclusive have Solid Gun-metal Piston and Stopper.

The Lever can be fitted at right angles to the position shown if desired.

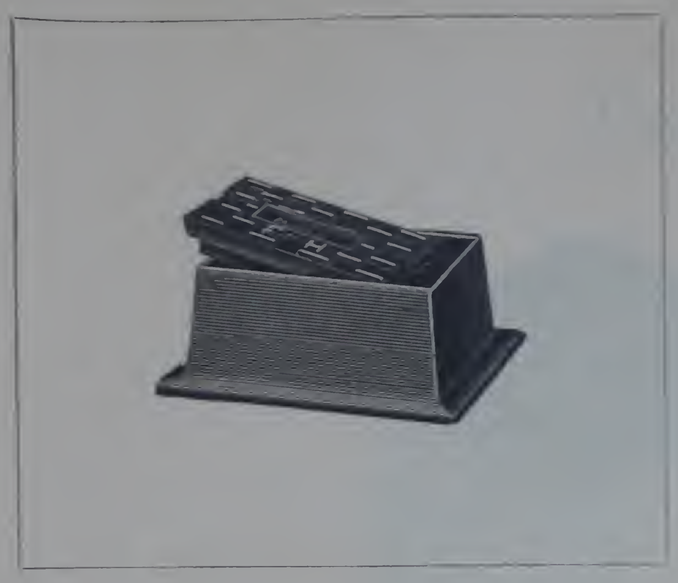
PRICES.

Sizes in inches ...	2	2½	3	4	5	6	7	8	9	10	12

To facilitate quoting, enquiries should state maximum pressure the Valve must close against.

Surface Boxes

For Hydrants and Air Valves



Dimensions in Inches.

Fig. No.	Inside size at Base.	Depth	Clear Opening.	Traffic suitable for	Price.
9060	$12\frac{1}{2} \times 9$	7	$9\frac{1}{2} \times 6$	Heavy	
9065	13×13	6	$10\frac{1}{4} \times 10\frac{1}{4}$	Ordinary	
9080	$15\frac{1}{2} \times 15\frac{1}{2}$	6	$12\frac{3}{4} \times 12\frac{3}{4}$	Heavy	
9093	17×14	8	$13\frac{1}{2} \times 10\frac{1}{2}$	,,	
9116	21×12	$5\frac{3}{4}$	$18\frac{1}{4} \times 9\frac{1}{4}$	Ordinary	

Dimensions in Inches.

Fig. No.	Inside size at Base.	Depth	Clear Opening.	Traffic suitable for	Price.
9165	28×11	4	26×9	Ordinary	
9178	32×14	6	30×12	Heavy	

Dimensions in Inches.

Fig. No.	Inside size at Base.	Depth	Clear Opening.	Traffic suitable for	Price.
9336	20×12	6	18×10	Heavy	
9348	$26\frac{3}{4} \times 13\frac{3}{4}$	$6\frac{1}{2}$	25×12	,,	
9365	36×18	6	34×16	,,	
9372	$43\frac{1}{2} \times 24$	6	$41\frac{1}{4} \times 22\frac{1}{4}$	Ordinary	

We have a big range of Surface Box Patterns in all sizes with hinged or drop lid, particulars of which will be forwarded on application.

All coated with Dr. Angus Smith's Solution.

Surface Boxes for Sluice Valves

Figs. 9479-81.

Dimensions in Inches.

Fig. No.	Inside Size at Base.	Depth.	Clear Open Dia.	Traffic suitable for
9479	$7\frac{1}{2}\times7\frac{1}{2}$	12	$3\frac{1}{2}$	Ordinary
9481	9 ×9	12	$3\frac{1}{2}$	Ordinary
9490	$9\frac{1}{4}$ diam.	12	$3\frac{3}{4}$	Heavy

Fig. 9490 *is specially recommended for paved roads, sett cutting being entirely obviated.*

Fig. 9490.

Fig. 9494.

Dimensions in Inches.

Fig. No.	Inside Dia. at Base.	Depth.	Clear Open Dia.	Traffic suitable for
9494	$7\frac{1}{2}$	8	$3\frac{3}{4}$	Heavy
9502	$7\frac{1}{2}$	$7\frac{3}{4}$	$3\frac{1}{2}$	Ordinary
9503	$7\frac{1}{2}$	$9\frac{1}{4}$	$3\frac{1}{2}$	Ordinary
9504	$7\frac{3}{4}$	$9\frac{1}{4}$	$3\frac{1}{2}$	Ordinary
9505	$9\frac{1}{2}$	12	3	Ordinary

Figs. 9502 to 5.

Surface Boxes for Hydrants and Stop Cocks

For Ball Hydrants.

Figs. 9017 and 9031.

Hinged Boxes are not recommended for heavy traffic.

Figs. 9531 and 9576.

DROP LID. **Dimensions in Inches.** **HINGED LID.**

Fig. No.	Inside at Base.	Depth.	Clear Opening.	Traffic suitable for	Fig. No.	Inside at Base.	Depth.	Clear Opening.	Traffic suitable for
9017	8×8	7	$5\frac{1}{2}\times5\frac{1}{2}$	Heavy	9531	$5\frac{3}{4}\times 5\frac{3}{4}$	$4\frac{1}{2}$	$3\frac{3}{4}\times3\frac{1}{4}$	Footpath
9031	9×9	$6\frac{1}{2}$	$7\frac{7}{8}\times7\frac{7}{8}$	,,	9576	$16\frac{1}{2}\times11$	6	$13\frac{3}{4}\times8\frac{1}{4}$	Heavy

Fig. 9531 is suitable for Stop Cocks.

We have a big range of Surface Box Patterns in all sizes with hinged or drop lid, particulars of which will be forwarded on application.

All coated with Dr. Angus Smith's Solution.

Indicator Plates for Valves, Hydrants, etc.

Fig. 9700.

Fig. 9701.

Fig. 9704.

Fig. 9707.

Fig. 9710.

Fig. 9713.
(Enamelled).

Fig. 9714.
(Enamelled).

Fig. 9715.
(Enamelled).

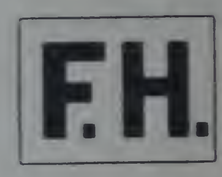


Fig. 9716.
(Enamelled).

Fig. 9720.

Fig. 9732.
(Enamelled).

Fig. 9725.

Fig. 9727.
(Enamelled).

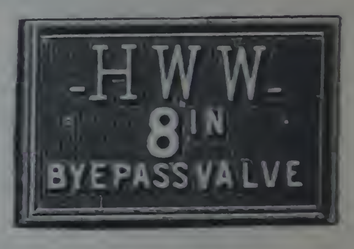


Fig. 9729.

Fig. 9731.

Fig. 9733.

Fig. 9735.

Fig. 9737.

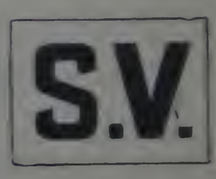


Fig. 9739.
(Enamelled)

The above Indicator Plates are Cast Iron except where otherwise stated.

The Cast Iron Indicator Plates are painted three coats white ground, with letters and border scarlet unless ordered otherwise.

The Enamelled Iron Indicator Plates, with white ground and scarlet letters or scarlet ground and white letters, unless ordered otherwise.

Prices range from to each according to quantity and alteration of distances required.

Indicator Plates are to scale of 1 inch to the foot.

Dimensions of Standard Flanges

For Test Pressures up to 800 ft.

Size of Valve. in.	Diam. of Flanges. in.	Cents. of Bolts. in.	No. of Bolt Holes.	Diam. of Bolts. in.
2	6	$4\frac{1}{2}$	4	$\frac{5}{8}$
$2\frac{1}{2}$	$6\frac{1}{2}$	5	4	$\frac{5}{8}$
3	$7\frac{1}{4}$	$5\frac{3}{4}$	4	$\frac{5}{8}$
4	$8\frac{1}{2}$	7	4	$\frac{5}{8}$
5	10	$8\frac{1}{4}$	8	$\frac{5}{8}$
6	11	$9\frac{1}{4}$	8	$\frac{5}{8}$
7	12	$10\frac{1}{4}$	8	$\frac{5}{8}$
8	$13\frac{1}{4}$	$11\frac{1}{2}$	8	$\frac{5}{8}$
9	$14\frac{1}{2}$	$12\frac{3}{4}$	8	$\frac{5}{8}$
10	16	14	8	$\frac{3}{4}$
12	18	16	12	$\frac{3}{4}$
14	$20\frac{3}{4}$	$18\frac{1}{2}$	12	$\frac{7}{8}$
15	$21\frac{3}{4}$	$19\frac{1}{2}$	12	$\frac{7}{8}$
16	$22\frac{3}{4}$	$20\frac{1}{2}$	12	$\frac{7}{8}$
18	$25\frac{1}{4}$	23	12	$\frac{7}{8}$
20	$27\frac{3}{4}$	$25\frac{1}{4}$	16	$\frac{7}{8}$
21	29	$26\frac{1}{2}$	16	$\frac{7}{8}$
24	$32\frac{1}{2}$	$29\frac{3}{4}$	16	1

Flanges are drilled to British Standard Table No. 1.

Dimensions of Standard Sockets

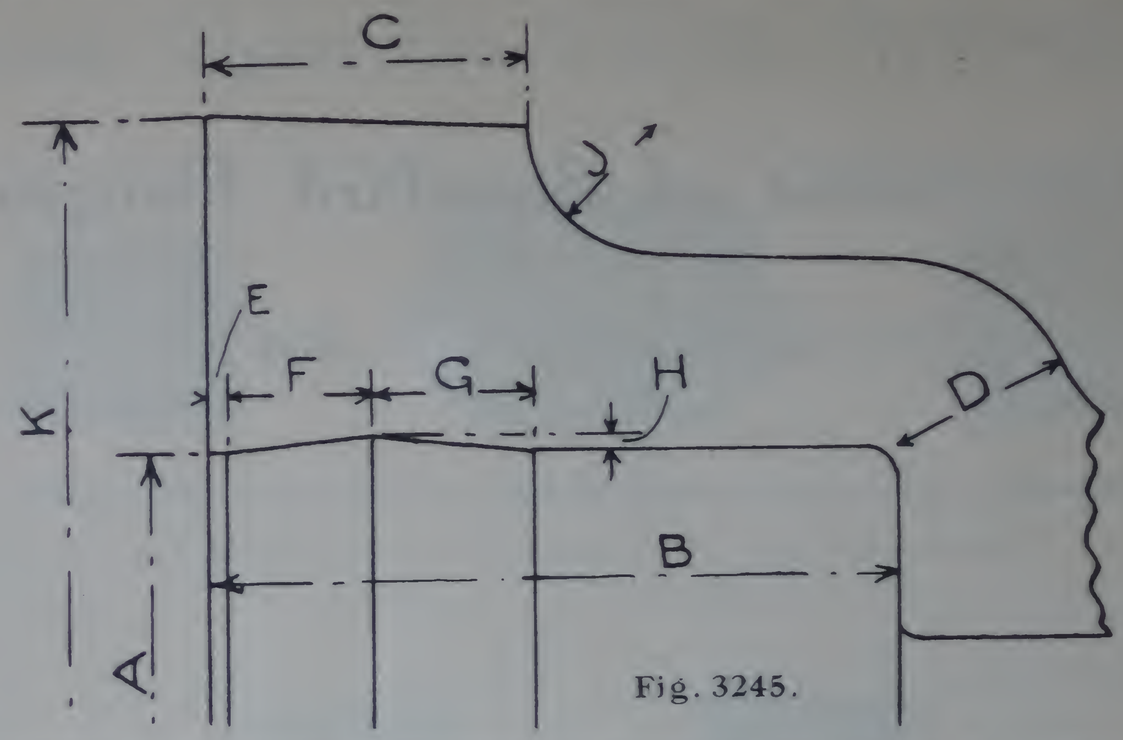


Fig. 3245.

Size of Valve. in.	A Medium Heavy in.		B in.	C in.	D Medium Heavy in.	E in.	F in.	G in.	H in.	J in.	K Medium Heavy in.	
2	3·375		$2\frac{3}{4}$	1	$\frac{9}{16}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{7}{16}$	5·25	
$2\frac{1}{2}$	4		$2\frac{3}{4}$	1	$\frac{9}{16}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{7}{16}$	5·875	
3	4·51		3	1	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{7}{16}$	6·51	
4	5·55		3	1	$\frac{11}{16}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{7}{16}$	7·55	
5	6·65		$3\frac{1}{2}$	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{8}$	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{1}{8}$	$\frac{1}{2}$	8·90	
6	7·73		$3\frac{1}{2}$	$1\frac{1}{4}$	$\frac{13}{16}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{9}{16}$	10·23	
7	8·81		$3\frac{1}{2}$	$1\frac{1}{4}$	$\frac{2}{3}\frac{7}{2}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{9}{16}$	11·31	
8	9·89		4	$1\frac{1}{4}$	$\frac{2}{3}\frac{9}{2}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{9}{16}$	12·51	
9	10·95		4	$1\frac{3}{8}$	$\frac{15}{16}$	$\frac{1}{8}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{1}{8}$	$\frac{9}{16}$	13·76	
10	12·01		4	$1\frac{7}{16}$	$\frac{15}{16}$	$\frac{1}{8}$	$\frac{1}{3}\frac{9}{2}$	$\frac{2}{3}\frac{5}{2}$	$\frac{1}{8}$	$\frac{9}{16}$	14·94	
12	14·35		4	$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{1}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{8}$	$\frac{9}{16}$	17·60	
14	15·97	16·47	$4\frac{1}{2}$	$1\frac{5}{8}$	$\frac{15}{16}$	$1\frac{3}{16}$	$\frac{1}{8}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{1}{8}$	$\frac{5}{8}$	19·47 19·97
15	17·01	17·53	$4\frac{1}{2}$	$1\frac{5}{8}$	$\frac{15}{16}$	$1\frac{7}{3}\frac{7}{2}$	$\frac{1}{8}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{1}{8}$	$\frac{5}{8}$	20·57 21·09
16	18·05	18·59	$4\frac{1}{2}$	$1\frac{5}{8}$	$\frac{3}{3}\frac{1}{2}$	$1\frac{7}{3}\frac{7}{2}$	$\frac{1}{8}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{1}{8}$	$\frac{5}{8}$	21·73 22·27
18	20·25	20·83	$4\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{16}$	$1\frac{1}{3}\frac{1}{2}$	$\frac{1}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{8}$	$\frac{5}{8}$	24·18 24·76
20	22·33	22·93	$4\frac{1}{2}$	$1\frac{7}{8}$	$1\frac{3}{3}\frac{9}{2}$	$1\frac{3}{3}\frac{3}{2}$	$\frac{1}{8}$	$\frac{13}{16}$	$\frac{15}{16}$	$\frac{1}{8}$	$\frac{11}{16}$	26·45 27·05
21	23·37	23·99	$4\frac{1}{2}$	$1\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{7}{16}$	$\frac{1}{8}$	$\frac{13}{16}$	$\frac{15}{16}$	$\frac{1}{8}$	$\frac{11}{16}$	27·62 28·24
24	26·47	27·13	5	2	$1\frac{3}{16}$	$1\frac{1}{2}$	$\frac{1}{8}$	$\frac{7}{8}$	1	$\frac{1}{8}$	$\frac{3}{4}$	31·03 31·69

Sundry Appliances

Fig. 3138.

Fig. 3138. Simplex Hedgehog Brushes are made in sizes from 3 in. to 24 in. diameter, and are suitable for cleaning water mains and other large pipes. Adjustment is provided for by screwing up the nut on the centre spindle. An eye is fitted to each end for attaching a wire rope or chain, and swivels, shackles, etc., can be fitted if desired.

Fig. 3139. Steel Caulking Tools and Chisels.

		£	s.	d.
A.	Caulking Hammer, complete			
B.	Caulking Tool			
C.	Yarning Tool			
D.	Round Nose Chisel			
E.	Diamond Point Chisel			
F.	Cross Cut Chisel			
G.	Flat Chisel			

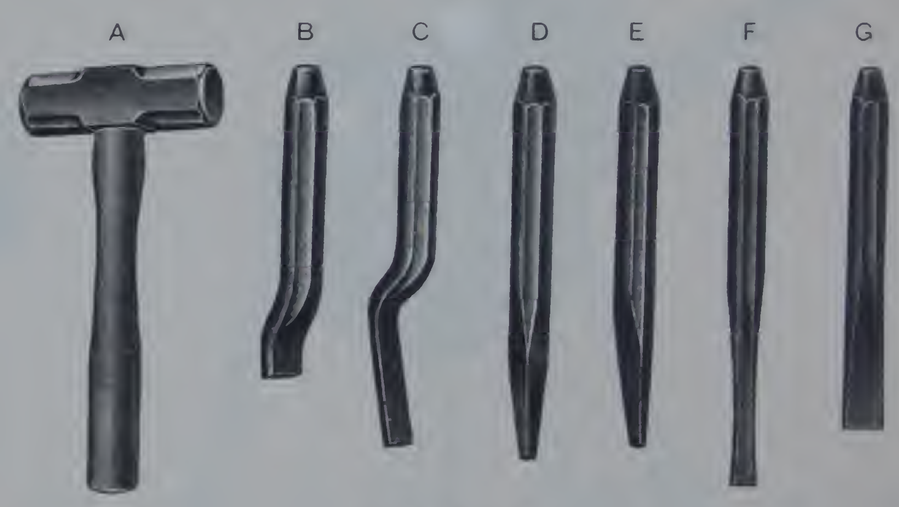


Fig. 3139.

Fig. 3140.

Fig. 3140. Picks and Shovels. The Picks are made of Solid Steel of the finest quality and temper.

The Shovels are of Forged, Rolled or Stamped Steel as required, although we strongly recommend the use of Forged Steel Blades owing to their longer life.

Pipe-Laying Tools

Fig. 3141.

Fig. 3143.

Fig. 3142. Cast Iron
Fig. 3142a. Steel (Semi-circular)

Fig. 3145.

Fig. 3144.

Fig. 3141. Fire Devil, Inside dia. at top, 14 in. 16 in. 18 in.

Fig. 3142. Lead Pot, with Wrought Iron Handle. Inside dia. 6 in. 8 in. 10 in. 12 in. 14 in.

Fig. 3143. Lead Ladle. 3 in. 4 in. 5 in. 6 in. 7 in. 8 in. 9 in. 10 in.

Fig. 3144. Patent Flexible Pipe Jointing Clips.
Size of Pipe 2 in. 3 in. 4 in. 6 in. 8 in. 9 in. 10 in. 12 in. 15 in. 18 in. 21 in. 24 in. 27 in. 30 in. 36 in. 42 in.

Fig. 3145. Jones' Patent Pipe Cutter for Cast Iron Pipes.

	To cut Pipes	Number of Wheels	Price £ s. d.	*each*
Fig. 3145	2" to 3"	5		*Extra Cutters,*
Fig. 3146	2" to 4"	6		
Fig. 3147	2" to 5"	7		
Fig. 3148	2" to 6"	8		
Fig. 3149	2" to 7"	9		
Fig. 3150	2" to 8"	10		

	To Cut Pipes	Number of Wheels	Price £ s. d.	*each*
Fig. 3151	5" to 6"	5		*Extra Cutters,*
Fig. 3152	5" to 7"	6		
Fig. 3153	5" to 8"	7		
Fig. 3154	5" to 10"	8		
Fig. 3155	5" to 11"	9		
Fig. 3156	5" to 13"	10		

Pipe-Laying Tools, etc.

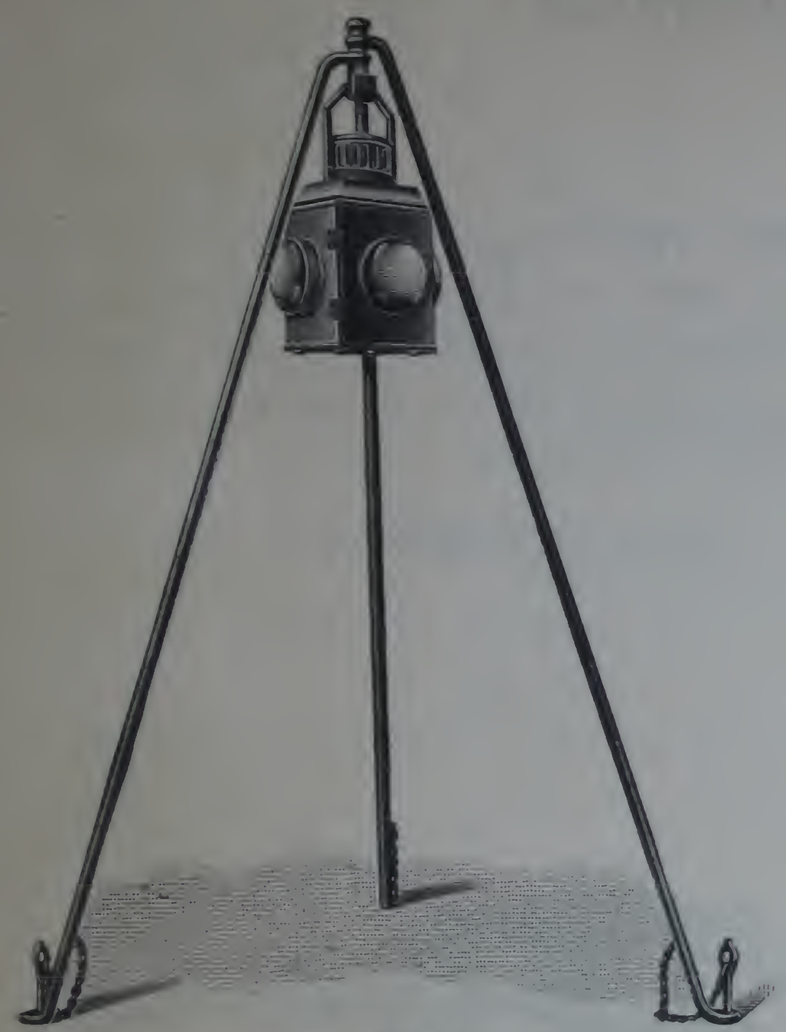


Fig. 3160.

Fig. 3160. Danger Lamp on Tubular Steel Tripod. The lamp is provided with solid Interchangeable Lenses, two Ruby and two White.

Prices on Application.

Fig. 3161. Shear Legs with Winch Attachment for laying Water Mains, etc. Complete with Gearing and a pair of one and two sheave Pulley Blocks.

These legs are also made in Tubular Steel.

Made to lift any weight.

Prices on Application.

Fig. 3161.

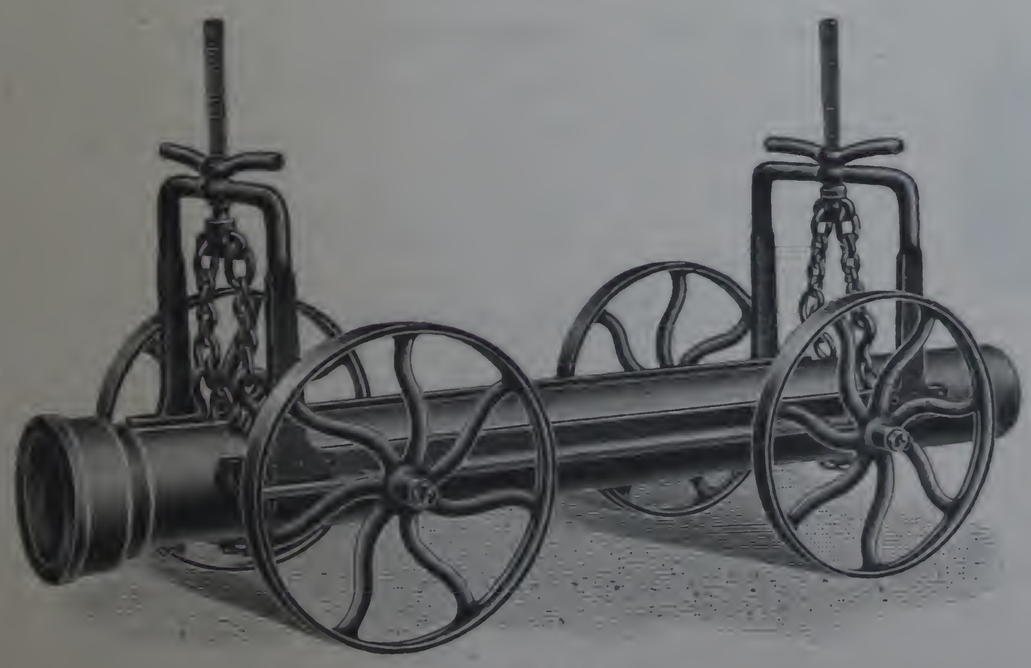


Fig. 3162.

Fig. 3162. Pipe Carriage, for handling large Pipes.

Made in all sizes.

Prices on Application.

Pipe-Scraping Apparatus

Fig. 3205.

Fig. 3205. Pipe Scraper, designed to work under pressure. The apparatus is provided with a Ball and Socket Joint to facilitate the negotiation of Bends. The Steel Cutters are adjustable and are arranged to obtain the maximum degree of efficiency.

Prices on Application.

Fig. 3206. Swift's Pipe Scraper, for scraping small mains by hand.

The Scraper is forced through the main by means of rods.

Prices on Application.

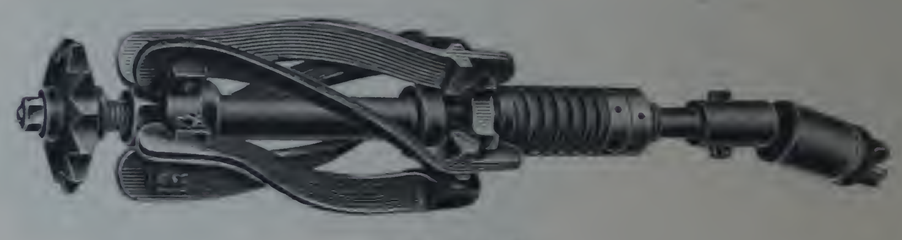


Fig. 3206.

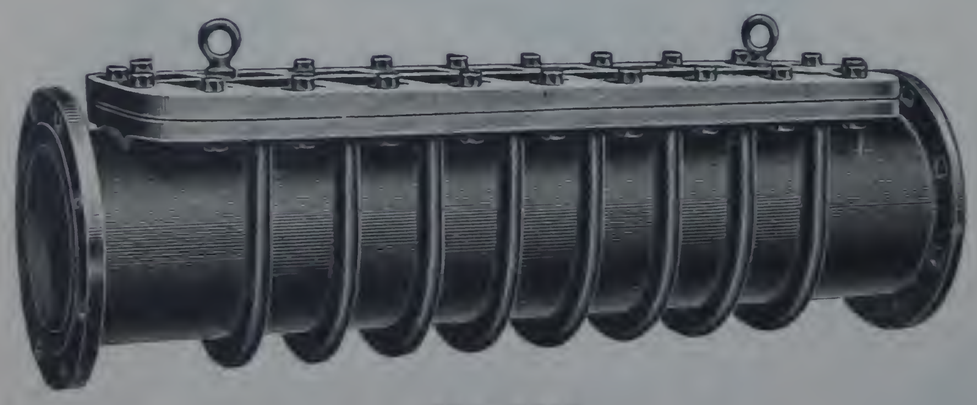


Fig. 3210.

Fig. 3210. Hatch Box of heavy design for fixing in water mains, to enable Pipe Scraper to be inserted and removed.

Made in all sizes.

Prices on Application.

Skilled men sent out to superintend Pipe-Scraping when required.

Standard 90° Bends

(To British Standard Specification.)

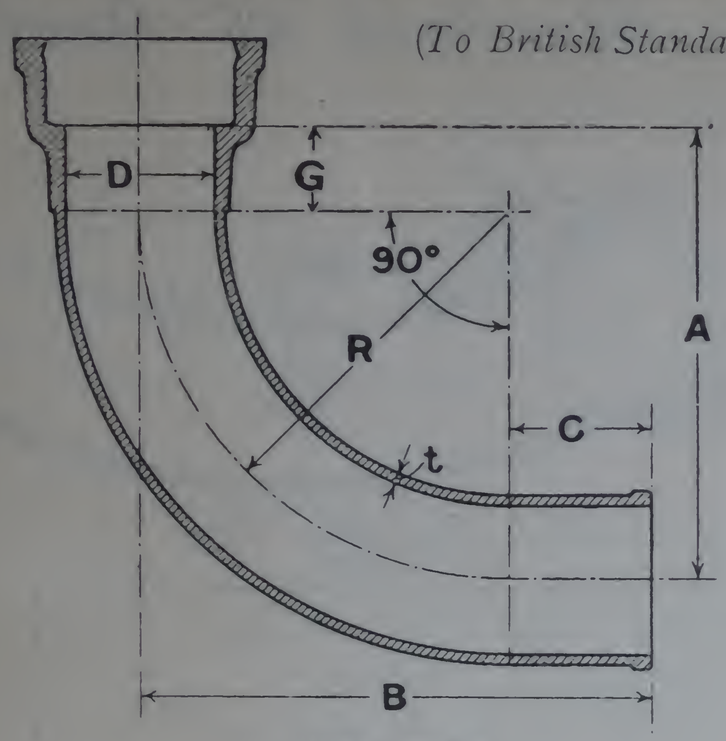


Fig. 9750.

Standard Collars

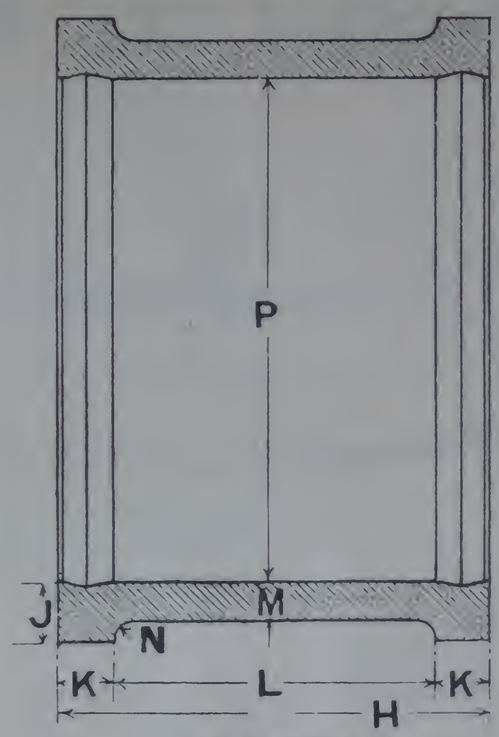


Fig. 9752.

Fig. 9750.

D Nominal Internal Diameter. in.	A ft.	A in.	B ft.	B in.	C ft.	C in.	G in.	R ft.	R in.	Class C. Test Pressure 600 ft. head. Thickness. t in.	External Diameter in.	Weight. cwt.	qrs.	lbs.	Price.
3	1	0	1	3	0	6	3	0	9	·40	3·76				
4	1	3	1	6	0	6	3	1	0	·46	4·80				
5	1	3½	1	6	0	6	3½	1	0	·52	5·90				
6	1	6½	1	9	0	6	3½	1	3	·57	6·98				
7	1	6½	1	10	0	7	3½	1	3	·61	8·06				
8	1	10	2	2	0	8	4	1	6	·65	9·14				
9	1	10	2	3	0	9	4	1	6	·69	10·20				
10	2	1	2	7	0	10	4	1	9	·73	11·26				
12	2	1	2	9	1	0	4	1	9	·80	13·60				

Fig. 9752.

Nominal Internal Diameter of Pipe. in.	H in.	J in.	K in.	L in.	N in.	Class C. Test Pressure 600 ft. head. M in.	P in.	Weight. cwt.	qrs.	lbs.	Price.
3	9	1	1	7	$\frac{7}{16}$	$2\frac{3}{32}$	$4\frac{5}{8}$				
4	9	1	1	7	$\frac{7}{16}$	$2\frac{5}{32}$	$5\frac{11}{16}$				
5	$10\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$8\frac{1}{4}$	$\frac{1}{2}$	$2\frac{7}{32}$	$6\frac{13}{16}$				
6	$10\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{4}$	8	$\frac{9}{16}$	$2\frac{9}{32}$	$7\frac{7}{8}$				
7	$10\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{4}$	8	$\frac{9}{16}$	$\frac{15}{16}$	$8\frac{15}{16}$				
8	12	$1\frac{5}{16}$	$1\frac{1}{4}$	$9\frac{1}{2}$	$\frac{9}{16}$	$1\frac{1}{32}$	10				
9	12	$1\frac{13}{32}$	$1\frac{3}{8}$	$9\frac{1}{4}$	$\frac{9}{16}$	$1\frac{1}{32}$	$11\frac{1}{16}$				
10	12	$1\frac{15}{32}$	$1\frac{7}{16}$	$9\frac{1}{8}$	$\frac{9}{16}$	$1\frac{1}{16}$	$12\frac{1}{8}$				
12	12	$1\frac{9}{16}$	$1\frac{1}{2}$	9	$\frac{9}{16}$	$1\frac{7}{32}$	$14\frac{1}{2}$				

All coated with Dr. Angus Smith's Solution. *Sockets are to British Standard Table No. 4 (see page 76).*

Standard $22\frac{1}{2}^{\circ}$ Bends

Standard 45° Bends

(To British Standard Specification.)

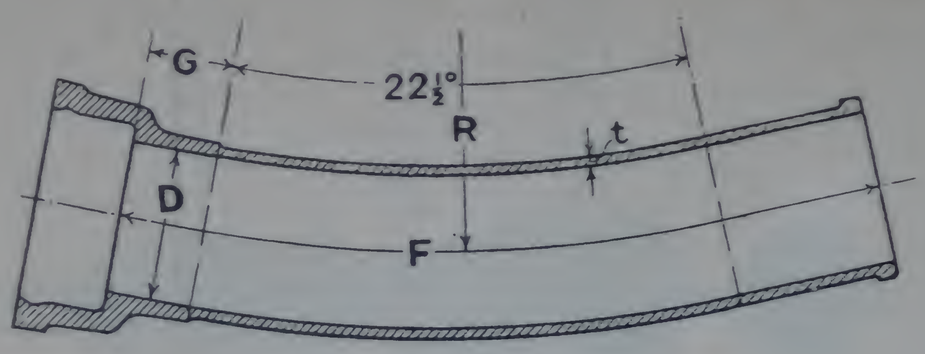


Fig. 9754.

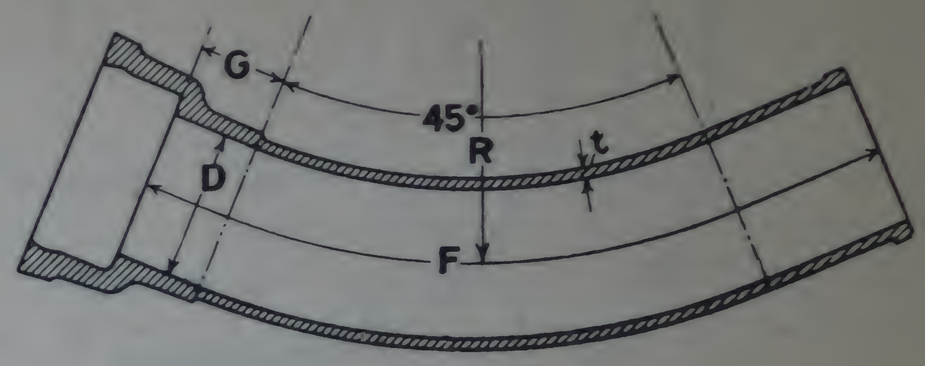


Fig. 9756.

Fig. 9754.

D Nominal Internal Diameter. in.	F ft.	F in.	G in.	R ft.	R in.	Class C. Test Pressure 600 ft. head. Thickness. t in.	External Diameter. in.	Weight. cwt. qrs. lbs.	Price.
3	2	4	3	4	0	·40	3·76		
4	2	4	3	4	0	·46	4·80		
5	2	7	3½	4	6	·52	5·90		
6	2	7	3½	4	6	·57	6·98		
7	2	9	3½	5	0	·61	8·06		
8	2	10	4	5	0	·65	9·14		
9	3	0	4	5	6	·69	10·20		
10	3	0	4	5	6	·73	11·26		
12	3	3	4	6	0	·80	13·60		

Fig. 9756.

D Nominal Internal Diameter. in.	F ft.	F in.	G in.	R ft.	R in.	Class C. Test Pressure 600 ft. head. Thickness. t in.	External Diameter. in.	Weight. cwt. qrs. lbs.	Price.
3	2	4	3	2	0	·40	3·76		
4	2	4	3	2	0	·46	4·80		
5	2	7	3½	2	3	·52	5·90		
6	2	7	3½	2	3	·57	6·98		
7	2	9	3½	2	6	·61	8·06		
8	2	10	4	2	6	·65	9·14		
9	3	0	4	2	9	·69	10·20		
10	3	0	4	2	9	·73	11·26		
12	3	3	4	3	0	·80	13·60		

All coated with Dr. Angus Smith's Solution.

Sockets are to British Standard Table No. 4 *(see page* 76).

Standard Tees

*(To British Standard Specification.)**

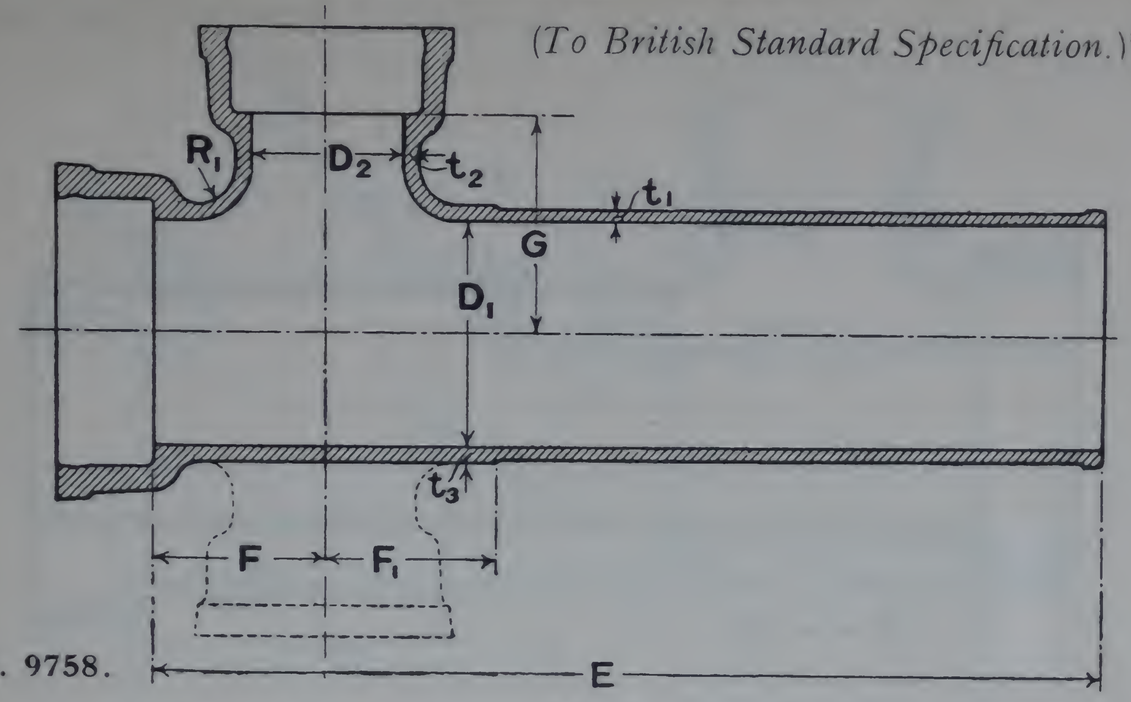


Fig. 9758.

The radius R_1 is $1\frac{1}{2}$ inches for all sizes of Tees.

Nominal Internal Diameter.		E	F and F_1	G	Class C. Test Pressure 600 ft. head.					
					Thickness.			External Diameter.	Weight.	Price.
D_1 in.	D_2 in.	ft. in.	ft. in.	ft. in.	t_1 in.	t_2 in.	t_3 in.	in.	cwt. qrs. lbs.	
* 3	2	3 0	0 5	0 5	·40	·50	·59	3·76		
*	$2\frac{1}{2}$	3 0	0 5	0 5	·40	·50	·59	3·76		
	3	3 0	0 5	0 5	·40	·59	·59	3·76		
* 4	2	3 0	0 5	0 6	·46	·50	·65	4·80		
*	$2\frac{1}{2}$	3 0	0 5	0 6	·46	·50	·65	4·80		
	3	3 0	0 5	0 6	·46	·59	·65	4·80		
	4	3 0	0 6	0 6	·46	·65	·65	4·80		
* 5	2	3 0	0 5	0 6	·52	·50	·71	5·90		
*	$2\frac{1}{2}$	3 0	0 5	0 6	·52	·50	·71	5·90		
	3	3 0	0 5	0 6	·52	·59	·71	5·90		
	4	3 0	0 6	0 6	·52	·65	·71	5·90		
	5	3 0	0 7	0 7	·52	·71	·71	5·90		
* 6	2	3 0	0 6	0 7	·57	·50	·76	6·98		
*	$2\frac{1}{2}$	3 0	0 6	0 7	·57	·50	·76	6·98		
	3	3 0	0 6	0 7	·57	·59	·76	6·98		
	4	3 0	0 6	0 7	·57	·65	·76	6·98		
	5	3 0	0 7	0 7	·57	·71	·76	6·98		
	6	3 0	0 7	0 7	·57	·76	·76	6·98		
7	3	3 0	0 6	0 7	·61	·59	·80	8·06		
	4	3 0	0 6	0 8	·61	·65	·80	8·06		
	5	3 0	0 7	0 8	·61	·71	·80	8·06		
	6	3 0	0 7	0 8	·61	·76	·80	8·06		
	7	3 0	0 8	0 8	·61	·80	·80	8·06		
8	3	3 6	0 6	0 8	·65	·59	·84	9·14		
	4	3 6	0 6	0 8	·65	·65	·84	9·14		
	5	3 6	0 7	0 8	·65	·71	·84	9.14		
	6	3 6	0 7	0 8	·65	·76	·84	9·14		

*Sizes marked thus * are to "Blakeborough" Standard.* **All coated with Dr. Angus Smith's Solution.**

Sockets are to British Standard Table No. 4 (see page 76).

British Standard Tees

(To British Standard Specification.)

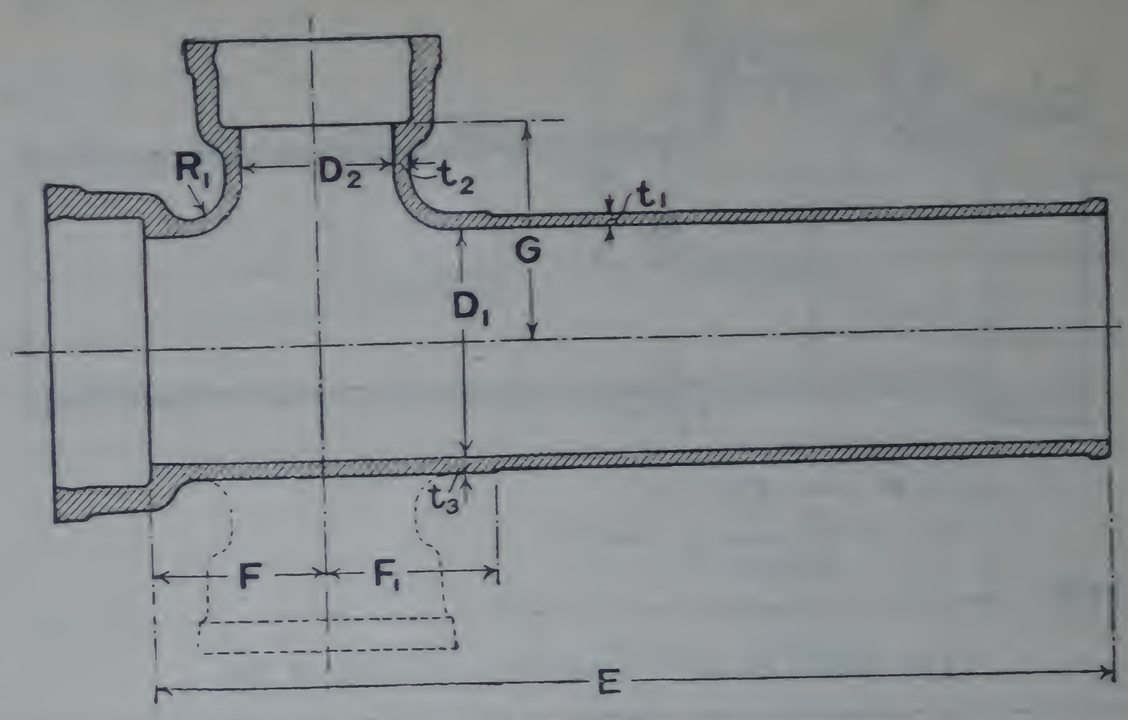


Fig. 9758.

Nominal Internal Diameter.		E	F and F1	G	Class C Test Pressure 600 ft head.					
					Thickness.			External Diameter.	Weight.	Price.
D_1 in.	D_2 in.	ft. in.	ft in.	ft. in.	t_1 in.	t_2 in.	t_3 in.	in.	cwt. qrs. lbs.	
	7	3 6	0 8	0 8	·65	·80	·84	9·14		
	8	3 6	0 8	0 8	·65	·84	·84	9·14		
9	3	3 6	0 6	0 8	·69	·59	·88	10·20		
	4	3 6	0 6	0 9	·69	·65	·88	10·20		
	5	3 6	0 7	0 9	·69	·71	·88	10·20		
	6	3 6	0 7	0 9	·69	·76	·88	10·20		
	7	3 6	0 8	0 9	·69	·80	·88	10·20		
	8	3 6	0 8	0 9	·69	·84	·88	10·20		
	9	3 6	0 9	0 9	·69	·88	·88	10·20		
10	3	3 6	0 6	0 9	·73	·59	·92	11·26		
	4	3 6	0 6	0 9	·73	·65	·92	11·26		
	5	3 6	0 7	0 9	·73	·71	·92	11·26		
	6	3 6	0 7	0 9	·73	·76	·92	11·26		
	7	3 6	0 8	0 9	·73	·80	·92	11·26		
	8	3 6	0 9	0 9	·73	·84	·92	11·26		
	9	3 6	0 9	0 10	·73	·88	·92	11·26		
	10	3 6	0 10	0 10	·73	·92	·92	11·26		
12	3	3 6	0 6	0 10	·80	·59	·99	13·60		
	4	3 6	0 7	0 10	·80	·65	·99	13·60		
	5	3 6	0 7	0 10	·80	·71	·99	13·60		
	6	3 6	0 8	0 10	·80	·76	·99	13·60		
	7	3 6	0 8	0 11	·80	·80	·99	13·60		
	8	3 6	0 9	0 11	·80	·84	·99	13·60		
	9	3 6	0 9	0 11	·80	·88	·99	13·60		
	10	3 6	0 10	0 11	·80	·92	·99	13·60		
	12	3 6	0 11	0 11	·80	·99	·99	13·60		

All coated with Dr. Angus Smith's Solution. *Sockets are to British Standard Table No. 4 (see page 76).*

Standard 45° Branches

*(To British Standard Specification.)**

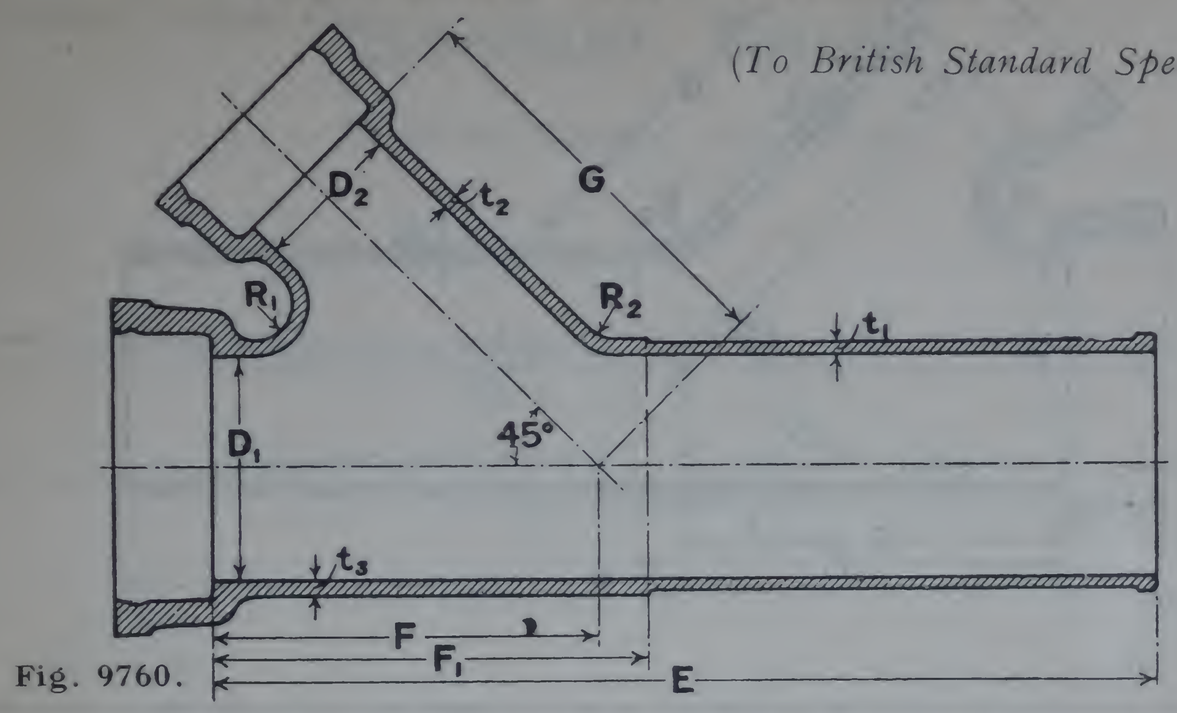


Fig. 9760.

The radii R_1 and R_2 shall be 1½ inches for all sizes of Branches.

Nominal Internal Diameter.		E	F	F1	G	Class C. Test Pressure 600 ft. head.					
						Thickness.			External Diameter.	Weight.	Price.
D1 in.	D2 in.	ft. in.	ft. in.	ft. in.	ft. in.	t1 in.	t2 in.	t3 in.	in.	cwt. qrs. lbs.	
* 3	2	3 0	0 10	1 1	0 10	·40	·50	·59	3·76		
*	2½	3 0	0 10	1 1	0 10	·40	·50	·59	3·76		
	3	3 0	0 10	1 1	0 10	·40	·59	·59	3·76		
* 4	2	3 0	0 10	1 1	0 11	·46	·50	·65	4·80		
*	2½	3 0	0 10	1 1	0 11	·46	·50	·65	4·80		
	3	3 0	0 11	1 1	0 11	·46	·59	·65	4·80		
	4	3 0	1 0	1 2	1 0	·46	·65	·65	4·80		
* 5	2	3 0	0 11	1 1	1 0	.52	·50	·71	5·90		
*	2½	3 0	0 11	1 1	1 0	·52	·50	·71	5·90		
	3	3 0	1 0	1 1	1 0	·52	·59	·71	5·90		
	4	3 0	1 0	1 2	1 0	·52	·65	·71	5·90		
	5	3 0	1 1	1 4	1 1	·52	·71	·71	5·90		
* 6	2	3 6	0 11	1 1	1 1	·57	·50	·76	6·98		
*	2½	3 6	0 11	1 1	1 1	·57	·59	·76	6·98		
	3	3 6	1 0	1 1	1 1	·57	·59	·76	6·98		
	4	3 6	1 1	1 3	1 1	·57	·65	·76	6·98		
	5	3 6	1 2	1 4	1 2	·57	·71	·76	6·98		
	6	3 6	1 3	1 6	1 3	·57	·76	·76	6·98		
7	3	3 6	1 1	1 1	1 1	·61	·59	·80	8·06		
	4	3 6	1 2	1 3	1 2	·61	·65	·80	8·06		
	5	3 6	1 2	1 4	1 3	·61	·71	·80	8·06		
	6	3 6	1 3	1 6	1 3	·61	·76	·80	8·06		
	7	3 6	1 4	1 7	1 4	·61	·80	·80	8·06		
8	3	3 6	1 1	1 1	1 2	·65	·59	·84	9·14		
	4	3 6	1 2	1 3	1 3	·65	·65	·84	9·14		
	5	3 6	1 3	1 4	1 3	·65	·71	·84	9·14		
	6	3 6	1 4	1 6	1 4	·65	·76	·84	9·14		

*Sizes marked thus * are to "Blakeborough" Standard.* **All coated with Dr. Angus Smith's Solution.**

Sockets are to British Standard Table No. 4 (see page 76).

Standard 45° Branches

*(To British Standard Specification.)**

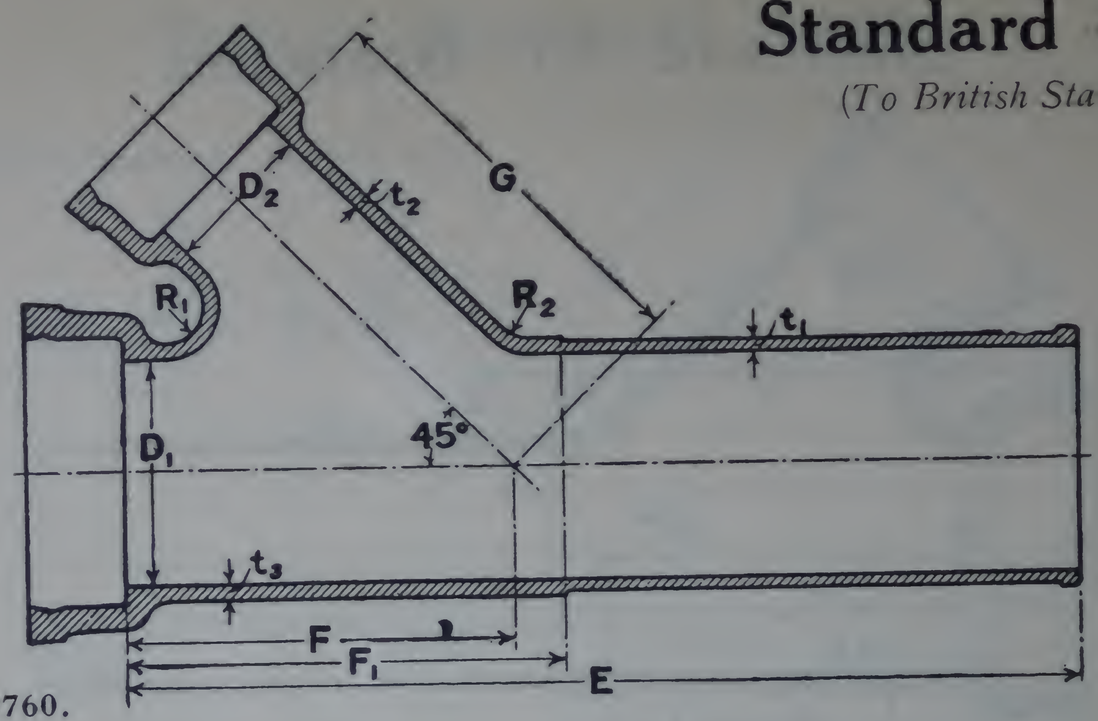


Fig. 9760.

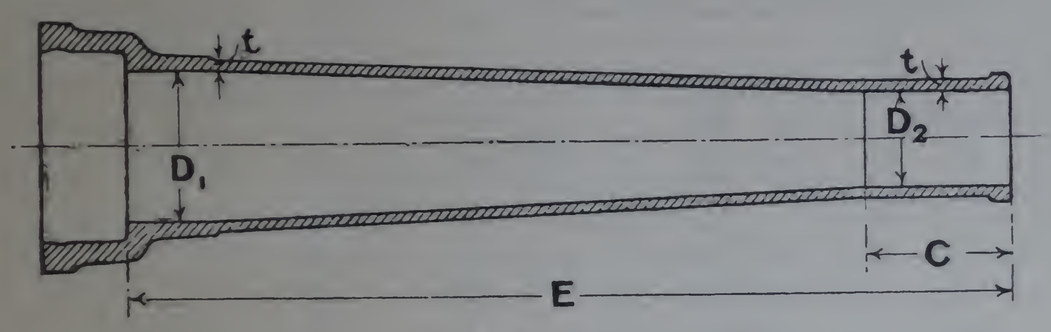
Nominal Internal Diameter.		E	F	F1	G	Class C. Test Pressure 600 ft. head.					
						Thickness.			External Diameter.	Weight.	Price.
D_1 in.	D_2 in.	ft. in.	ft. in.	ft. in.	ft. in.	t_1 in.	t_2 in.	t_3 in.	in.	cwt. qrs. lbs.	
	7	3 6	1 5	1 7	1 5	·65	·80	·84	9·14		
	8	3 6	1 5	1 9	1 5	·65	·84	·84	9·14		
9	3	3 6	1 2	1 1	1 3	·69	·59	·88	10·20		
	4	3 6	1 3	1 3	1 4	·69	·65	·88	10·20		
	5	3 6	1 4	1 4	1 4	·69	·71	·88	10·20		
	6	3 6	1 4	1 6	1 5	·69	·76	·88	10·20		
	7	3 6	1 5	1 7	1 5	·69	·80	·88	10·20		
	8	3 6	1 6	1 9	1 6	·69	·84	·88	10·20		
	9	3 6	1 7	1 10	1 7	·69	·88	·88	10·20		
10	3	4 0	1 3	1 1	1 4	·73	·59	·92	11·26		
	4	4 0	1 3	1 3	1 4	·73	·65	·92	11·26		
	5	4 0	1 4	1 4	1 5	·73	·71	·92	11·26		
	6	4 0	1 5	1 6	1 6	·73	·76	·92	11·26		
	7	4 0	1 6	1 7	1 6	·73	·80	·92	11·26		
	8	4 0	1 6	1 9	1 7	·73	·84	·92	11·26		
	9	4 0	1 7	1 11	1 7	·73	·88	·92	11·26		
	10	4 0	1 8	2 0	1 8	·73	·92	·92	11·26		
12	3	4 0	1 4	1 2	1 5	·80	·59	·99	13·60		
	4	4 0	1 5	1 3	1 6	·80	·65	·99	13·60		
	5	4 0	1 6	1 5	1 7	·80	·71	·99	13·60		
	6	4 0	1 6	1 6	1 7	·80	·76	·99	13·60		
	7	4 0	1 7	1 8	1 8	·80	·80	·99	13·60		
	8	4 0	1 8	1 9	1 8	·80	·84	·99	13·60		
	9	4 0	1 9	1 11	1 9	·80	·88	·99	13·60		
	10	4 0	1 9	2 0	1 10	·80	·92	·99	13·60		
	12	4 0	1 11	2 4	1 11	·80	·99	·99	13·60		

All coated with Dr. Angus Smith's Solution.

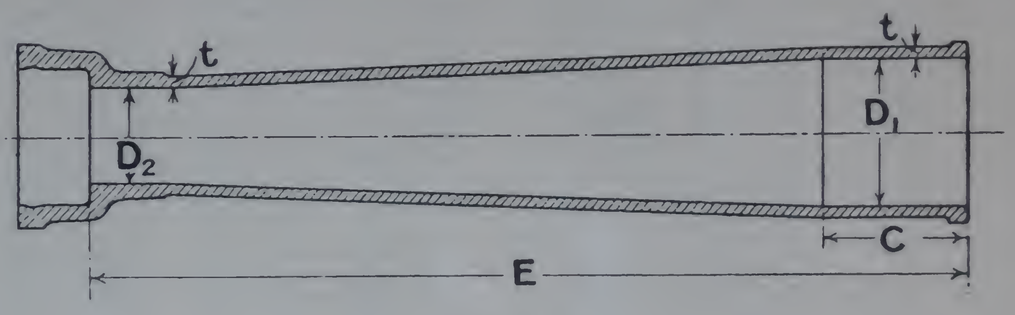
Sockets are to British Standard Table No. 4 (see page 76).

Standard Tapers

(To British Standard Specification).



Type 1.
Fig. 9762.



Type 2.
Fig. 9764.

Nominal Internal Diameter.				Class C. Test Pressure 600 ft. head.				
					Type 1. Fig. 9762.		Type 2. Fig. 9764.	
D_1 in.	D_2 in.	E ft. in.	C in.	Thickness t in.	Weight cwt. qrs. lbs.	Price.	Weight cwt. qrs. lbs.	Price.
4	3	3 0	6	·46				
5	4	3 0	6	·52				
5	3	3 0	6	·52				
6	5	3 0	6	·57				
6	4	3 0	6	·57				
6	3	3 0	6	·57				
7	6	3 0	6	·61				
7	4	3 0	6	·61				
8	7	3 0	6	·65				
8	6	3 0	6	·65				
9	8	3 0	6	·69				
9	6	3 0	6	·69				
10	9	3 0	6	·73				
10	8	3 0	6	·73				
12	9	4 0	6	·80				

All coated with Dr. Angus Smith's Solution.

Sockets are to British Standard Table No. 4 (*see page* 76).

Head, Velocity and Pressure

Head ft.	Pressure lbs. per sq. in.	Velocity ft. per sec.	Head ft.	Pressure lbs. per sq. in.	Velocity ft. per sec.
0·1	0·043	2·54	70	30·1	67·1
0·2	0·086	3·59	75	32·25	69·5
0·3	0·129	4·39	80	34·4	71·8
0·4	0·172	5·07	85	36·55	74
0·5	0·215	5·67	90	38·7	76·1
0·6	0·258	6·22	95	40·85	78·2
0·7	0·301	6.71	100	43	80·3
0·8	0·344	7·18	110	47·3	84
0·9	0·387	7·61	120	51·6	87·68
1	0·43	8·03	125	53·75	89·71
2	0·86	11·4	130	55·9	91·5
3	1·29	13·9	140	60·2	94·7
4	1·72	16·06	150	64·5	98·3
5	2·15	17·9	160	68·8	101·2
6	2·58	19	170	73·1	104·5
7	3·01	21·2	180	77·4	107·2
8	3·44	22·7	190	81·7	110·4
9	3·87	24·1	200	86	113·5
10	4·3	25·4	225	96·75	120
11	4·73	26·6	250	107·5	126
12	5·16	27·8	275	117·25	133
13	5·59	28·9	300	129	139
14	6·02	30	325	143	144
15	6·45	31·1	350	150·5	150
16	6·88	32·1	375	161·25	155
17	7·31	33·1	400	172	160
18	7·74	34	425	182·75	165
19	8·17	35	450	193·5	170
20	8·60	35·9	475	204·25	174
25	10·75	40·1	500	215	179
30	12·9	43·0	525	225·75	184
35	15·05	47·4	550	236·5	188
40	17·2	50·7	575	247·25	192
45	19·35	53·8	600	258	197
50	21·5	56·7	625	268·75	200
55	23·6	59·5	650	279·5	204
60	25·8	62·1	657	290·25	208
65	27·95	64·7	700	301	212

Equivalents of Kilogrammes per Square Centimetre in Pounds per Square Inch

K.	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9	K.
1	14·222	15·645	17·067	18·489	19·911	21·334	22·756	24·178	25·601	27·023	1
2	28·445	29·867	31·290	32·712	34·134	35·557	36·979	38·401	39·823	41·246	2
3	42·668	44·090	45·513	46·935	48·357	49·779	51·202	52·624	54·046	55·469	3
4	56·891	58·313	59·735	61·158	62·580	64·002	65·425	66·847	68·269	69·691	4
5	71·114	72·536	73·958	75·380	76·803	78·225	79·647	81·070	82·492	83·914	5
6	85·336	86·759	88·181	89·603	91·026	92·448	93·870	95·292	96·715	98·137	6
7	99·559	100·982	102·404	103·827	105·249	106·671	108·093	109·516	110·938	112·360	7
8	113·783	115·205	116·627	118·049	119·472	120·894	122·316	123·739	125·161	126·583	8
9	128·005	129·428	130·850	132·272	133·695	135·117	136·539	137·961	139·384	140·806	9
10	142·228	143·650	145·073	146·495	147·917	149·340	150·762	152·184	153·606	155·029	10
11	156·451	157·873	159·296	160·718	162·140	163·562	164·985	166·407	167·829	169·252	11
12	170.674	172·096	173·518	174·941	176·363	177·785	179 208	180·630	182·052	183·474	12
13	184·897	186·319	187·741	189·164	190·586	192·008	193·430	194·853	196·275	197·697	13
14	199·119	200·542	201·964	203·386	204·809	206·231	207·653	209·075	210·498	211·920	14
15	213·342	214·765	216·187	217·609	219·031	220·454	221·876	223·298	224·721	226·143	15
16	227·565	228·987	230·410	231·832	233·254	234·677	236·099	237·521	238·943	240·366	16
17	241·788	243·210	244·633	246·055	247·477	248·899	250·322	251·744	253·166	254·588	17
18	256·011	257·433	258·855	260·278	261·700	263·122	264·544	265·967	267·389	268·811	18
19	270·234	271·656	273·078	274·500	275·923	277·345	278·767	280·190	281·612	283·034	19
20	284·456	285·879	287·301	288·723	290·146	291·568	292·990	294·412	295·835	297·257	20

Equivalents of Pounds per Square Inch in Kilogrammes per Square Centimetre

P.	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9	P.
1	·07031	·07734	·08437	·09140	·09843	·10546	·11250	·11953	·12656	·13359	1
2	·14062	·14765	·15468	·16171	·16874	·17577	·18281	·18984	·19687	·20390	2
3	·21093	·21796	·22499	·23202	·23905	·24608	·25311	·26015	·26718	·27421	3
4	·28124	·28827	·29530	·30233	·30936	·31639	·32342	·33046	·33749	·34452	4
5	·35155	·35858	·36561	·37264	·37967	·38670	·39373	·40076	·40780	·41483	5
6	·42186	·42889	·43592	·44295	·44998	·45701	·46404	·47107	·47811	·48514	6
7	·49217	·49920	·50623	·51326	·52029	·52732	·53435	·54138	·54841	·55545	7
8	·56248	·56951	·57654	·58357	·59060	·59763	·60466	·61169	·61872	·62576	8
9	·63279	·63982	·64685	·65388	·66091	·66794	·67497	·68200	·68903	·69606	9
10	·70310	·71013	·71716	·72419	·73122	·73825	·74528	·75231	·75934	·76637	10
11	·77314	·78044	·78747	·79450	·80153	·80856	·81559	·82262	·82965	·83668	11
12	·84371	·85075	·85778	·86481	·87184	·87887	·88590	·89293	·89996	·90699	12
13	·91402	·92106	·92809	·93512	·94215	·94918	·95621	·96324	·97027	·97730	13
14	·98433	·99137	·99840	1·00543	1·01246	1·01949	1·02652	1·03355	1·04058	1·04761	14
15	1·05464	1·06167	1·06871	1·07574	1·08277	1·08980	1·09683	1·10386	1·11089	1·11792	15
16	1·12495	1·13198	1·13901	1·14605	1·15308	1·16011	1·16714	1·17417	1·18120	1·18823	16
17	1·19526	1·20229	1·20932	1·21636	1·22339	1·23042	1·23745	1·24448	1·25151	1·25854	17
18	1·26557	1·27260	1·27963	1·28666	1·29370	1·30073	1·30776	1·31479	1·32182	1·32885	18
19	1·33588	1.34291	1·34994	1·35697	1.36401	1·37104	1·37807	1·38510	1·39213	1·39916	19
20	1·40619	1·41322	1·42025	1·42728	1·43431	1·44135	1·44838	1·45541	1·46244	1·46947	20

Equivalents of Square Centimetres in Square Inches

Sq. Cent	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9	Sq. Cent
1	·15500	·17050	·18600	·20150	·21700	·23250	·24800	·26351	·27901	·29451	1
2	·31001	·32551	·34101	·35651	·37201	·38751	·40301	·41851	·43401	·44951	2
3	·46501	·48051	·49601	·51151	·52702	·54252	·55802	·57352	·58902	·60452	2
4	·62002	·63552	·65102	·66652	·68202	·69752	·71302	·72852	·74402	·75952	4
5	·77503	·79053	·80603	·82153	·83703	·85253	·86803	·88353	·89903	·91453	5
6	·93003	·94553	·96103	·97653	·99203	1·00754	1·02304	1·03854	1·05404	1·06954	6
7	1·08504	1·10054	1·11604	1·13154	1·14704	1·16254	1·17804	1·19355	1·20905	1·22455	7
8	1·24005	1·25555	1·27105	1·28655	1.30205	1·31755	1·33305	1·34855	1·36405	1·37955	8
9	1·39505	1.41055	1·42605	1·44155	1·45706	1·47256	1·48806	1·50356	1·51906	1·53456	9
10	1·55006	1·56556	1·58106	1·59656	1·61206	1·62756	1·64306	1·65856	1·67406	1·68956	10

Equivalents of Square Inches in Square Centimetres

Sq. In.	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9	Sq. In.
1	6·4513	7·0965	7·7416	8·3867	9·0319	9·6770	10·3222	10·9673	11·6125	12·2576	1
2	12·9027	13·5479	14·1930	14·8381	15·4833	16·1284	16·7736	17·4187	18.0638	18·7090	2
3	19·3541	19·9992	20·6444	21·2895	21·9346	22·5798	23·2249	23·8701	24·5152	25·1603	3
4	25.8055	26·4506	27·0957	27·7409	28·3860	29·0312	29·6763	30·3214	30·9666	31·6117	4
5	32·2568	32·9020	33·5471	34·1922	34·8374	35·4825	36·1277	36·7728	37·4179	38·0631	5
6	38·7082	39·3533	39·9985	40·6436	41·2887	41·9339	42·5790	43·2242	43·8693	44·5144	6
7	45·1596	45·8047	46·4498	47·0950	47·7401	48·3853	49·0304	49·6755	50·3207	50·9658	7
8	51·6109	52·2561	52·9012	53·5463	54·1915	54·8366	55·4818	56·1269	56·7720	57·4172	8
9	58·0623	58·7074	59·3526	59·9977	60·6428	61·2880	61·9331	62·5783	63·2234	63·8685	9
10	64·5137	65·1588	65·8039	66·4491	67·0942	67·7394	68·3845	69·0296	69·6748	70·3199	10

Equivalents of Millimetres in Inches

Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches
1	·0394	57	2·2441	113	4·4489	169	6·6537	225	8·8584	281	11·0632
2	·0787	58	2·2835	114	4·4883	170	6·6930	226	8·8978	282	11·1026
3	·1181	59	2.3229	115	4·5276	171	6·7324	227	8·9327	283	11·1419
4	·1575	60	2·3622	116	4·5670	172	6·7718	228	8·9765	284	11·1813
5	·1969	61	2·4016	117	4·6064	173	6·8111	229	9·0159	285	11·2207
6	·2362	62	2·4410	118	4·6458	174	6·8505	230	9·0553	286	11·2600
7	·2756	63	2·4804	119	4·6851	175	6·8899	231	9·0947	287	11·2994
8	·3150	64	2·5197	120	4·7245	176	6·9293	232	9·1340	288	11·3388
9	·3543	65	2·5591	121	4·7639	177	6·9686	233	9·1734	289	11·3782
10	·3937	66	2·5985	122	4·8032	178	7·0080	234	9·2128	290	11·4175
11	·4331	67	2.6378	123	4.8426	179	7·0474	235	9·2521	291	11·4569
12	·4724	68	2.6772	124	4·8820	180	7.0867	236	9·2915	292	11·4963
13	·5118	69	2·7166	125	4·9213	181	7·1261	237	9·3309	293	11·5356
14	·5512	70	2·7560	126	4·9607	182	7·1655	238	9·3702	294	11·5750
15	·5906	71	2·7953	127	5·0001	183	7·2049	239	9·4096	295	11·6144
16	·6299	72	2·8347	128	5·0395	184	7·2442	240	9·4490	296	11·6538
17	·6693	73	2·8741	129	5·0788	185	7·2836	241	9·4884	297	11·6931
18	·7087	74	2·9134	130	5·1182	186	7·3230	242	9·5277	298	11·7325
19	·7480	75	2·9528	131	5·1576	187	7·3623	243	9·5671	299	11·7719
20	·7874	76	2·9922	132	5·1969	188	7·4017	244	9·6065	300	11·8112
21	·8268	77	3.0316	133	5·2363	189	7·4411	245	9·6458	301	11·8506
22	·8662	78	3·0709	134	5·2757	190	7·4805	246	9·6852	302	11·8900
23	·9055	79	3·1103	135	5.3151	191	7·5189	247	9·7246	303	11·9293
24	·9449	80	3·1497	136	5·3544	192	7·5592	248	9·7640	304	11·9687
25	·9843	81	3·1890	137	5·3938	193	7·5986	249	9·8033	305	12·0081
26	1·0236	82	3·2284	138	5·4332	194	7·6379	250	9·8427	306	12·0475
27	1·0630	83	3·2678	139	5.4725	195	7·6773	251	9·8821	307	12·0868
28	1·1024	84	3·3071	140	5·5119	196	7·7167	252	9·9214	308	12·1262
29	1·1418	85	3·3465	141	5·5513	197	7·7560	253	9·9608	309	12·1656
30	1·1811	86	3·3859	142	5·5907	198	7·7954	254	10·0002	310	12·2049
31	1·2205	87	3·4253	143	5·6300	199	7·8348	255	10·0396	311	12·2443
32	1·2599	88	3·4646	144	5·6695	200	7·8742	256	10·0789	312	12·2837
33	1·2992	89	3·5040	145	5.7088	201	7·9135	257	10·1183	313	12·3231
34	1·3386	90	3·5434	146	5·7481	202	7·9529	258	10·1577	314	12·3624
35	1·3780	91	3·5827	147	5·7875	203	7·9923	259	10·1970	315	12·4018
36	1·4173	92	3·6221	148	5·8269	204	8·0316	260	10·2364	316	12·4412
37	1·4567	93	3·6615	149	5·8662	205	8·0710	261	10·2758	317	12·4805
38	1·4961	94	3·7009	150	5·9056	206	8·1104	262	10·3151	318	12·5199
39	1·5355	95	3·7402	151	5·9450	207	8·1498	263	10·3545	319	12·5593
40	1·5748	96	3·7796	152	5·9844	208	8·1891	264	10·3939	320	12·5987
41	1·6142	97	3·8190	153	6·0237	209	8·2285	265	10·4333	321	12·6380
42	1·6536	98	3·8583	154	6·0631	210	8·2679	266	10·4726	322	12·6774
43	1·6929	99	3·8977	155	6·1025	211	8·3072	267	10·5120	323	12·7168
44	1·7323	100	3·9371	156	6·1418	212	8·3466	268	10·5514	324	12·7561
45	1·7717	101	3·9764	157	6·1812	213	8·3860	269	10·5907	325	12·7955
46	1·8111	102	4·0158	158	6·2206	214	8·4253	270	10·6310	326	12·8349
47	1·8504	103	4·0552	159	6·2600	215	8·4647	271	10·6695	327	12·8742
48	1·8898	104	4·0946	160	6·2993	216	8·5041	272	10·7089	328	12·9136
49	1·9292	105	4·1339	161	6·3387	217	8·5435	273	10·7482	329	12·9530
50	1·9685	106	4·1733	162	6·3781	218	8·5828	274	10·7876	330	12·9924
51	2·0079	107	4·2127	163	6·4174	219	8·6222	275	10·8270	331	13·0317
52	2·0473	108	4·2520	164	6·4568	220	8·6616	276	10·8663	332	13·0711
53	2·0867	109	4·2914	165	6·4962	221	8·7009	277	10·9057	333	13·1105
54	2·1260	110	4·3308	166	6·5356	222	8·7403	278	10·9451	334	13·1498
55	2·1654	111	4·3702	167	6·5749	223	8·7797	279	10·9845	335	13·1892
56	2·2048	112	4·4095	168	6·6143	224	8·8191	280	11·0238	336	13·2286

Equivalents of Millimetres in Inches—*continued.*

Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches
337	13·2680	393	15·4727	449	17·6775	505	19·8822	561	22·0870	617	24·2918
338	13·3073	394	15·5121	450	17·7169	506	19·9216	562	22·1264	618	24·3311
339	13·3467	395	15·5515	451	17·7562	507	19·9610	563	22·1658	619	24·3705
340	13·3861	396	15·5908	452	17·7956	508	20·0004	564	22·2051	620	24·4099
341	13·4254	397	15·6302	453	17·8350	509	20·0397	565	22·2445	621	24·4493
342	13·4648	398	15·6696	454	17.8743	510	20·0791	566	22·2839	622	24·4886
343	13·5042	399	15·7089	455	17.9137	511	20·1185	567	22·3232	623	24·5280
344	13·5436	400	15·7483	456	17·9531	512	20·1578	568	22·3626	624	24·5674
345	13·5829	401	15·7877	457	17·9925	513	20·1972	569	22·4020	625	24·6067
346	13·6223	402	15·8271	458	18·0318	514	20·2366	570	22·4414	626	24·6461
347	13·6617	403	15·8664	459	18·0712	515	20·2760	571	22·4807	627	24·6855
348	13·7010	404	15.9058	460	18·1106	516	20·3153	572	22·5201	628	24·7249
349	13·7404	405	15·9452	461	18·1499	517	20·3547	573	22·5595	629	24·7642
350	13·7798	406	15·9845	462	18·1893	518	20·3941	574	22·5988	630	24·8036
351	13·8191	407	16·0239	463	18·2287	519	20·4334	575	22·6382	631	24·8430
352	13·8585	408	16·0633	464	18·2680	520	20·4728	576	22·6776	632	24·8823
353	13·8979	409	16·1027	465	18·3074	521	20·5122	577	22·7169	633	24·9217
354	13·9373	410	16·1420	466	18·3468	522	20·5516	578	22·7563	634	24·9611
355	13.9766	411	16·1814	467	18·3862	523	20·5909	579	22·7957	635	25·0005
356	14·0160	412	16·2208	468	18·4255	524	20·6303	580	22·8351	636	25·0398
357	14·0554	413	16·2601	469	18·4649	525	20·6697	581	22·8744	637	25·0792
358	14·0947	414	16·2995	470	18·5043	526	20·7090	582	22·9138	638	25·1186
359	14·1341	415	16·3389	471	18·5436	527	20·7484	583	22·9532	639	25·1579
360	14·1735	416	16·3782	472	18·5830	528	20·7878	584	22·9925	640	24·1973
361	14·2129	417	16·4176	473	18·6224	529	20·8271	585	23·0319	641	25·2367
362	14·2522	418	16·4570	474	18·6618	530	20·8665	586	23·0713	642	25·2760
363	14·2916	419	16·4964	475	18·7011	531	20·9059	587	23·1107	643	25·3154
364	14·3310	420	16·5357	476	18·7405	532	20·9453	588	23·1500	644	25·3548
365	14·3703	421	16·5751	477	18·7799	533	20·9846	589	23·1894	645	25·3942
366	14·4097	422	16·6145	478	18·8192	534	21·0240	590	23·2288	646	25·4335
367	14·4491	423	16·6538	479	18·8586	535	21·0634	591	23·2681	647	25·4729
368	14·4885	424	16·6932	480	18·8980	536	21·1027	592	23·3075	648	25·5123
369	14·5278	425	16·7326	481	18·9373	537	21·1421	593	23·3469	649	25·5516
370	14·5672	426	16·7720	482	18·9767	538	21·1815	594	23·3862	650	25·5910
371	14·6066	427	16·8113	483	19·0161	539	21·2209	595	23·4256	651	25·6304
372	14·6459	428	16·8507	484	19·0555	540	21·2602	596	23·4650	652	25·6698
373	14·6853	429	16·8901	485	19·0948	541	21·2996	597	23·5044	653	25·7091
374	14·7247	430	16·9294	486	19·1342	542	21·3390	598	23·5437	654	25·7485
375	14·7640	431	16·9688	487	19·1736	543	21·3783	599	23·5831	655	25·7879
376	14·8034	432	17·0082	488	19·2129	544	21·4177	600	23·6225	656	25·8272
377	14·8428	433	17·0476	489	19·2523	545	21·4571	601	23·6618	657	25·8666
378	14·8822	434	17·0869	490	19·2917	546	21·4965	602	23·7012	658	25·9060
379	14·9215	435	17·1263	491	19·3311	547	21·5358	603	23·7406	659	25·9454
380	14·9609	436	17·1657	492	19·3704	548	21·5752	604	23·7800	660	25·9847
381	15·0003	437	17·2050	493	19·4098	549	21·6146	605	23·8193	661	26·0241
382	15·0396	438	17·2444	494	19·4492	550	21·6539	606	23·8587	662	26·0635
383	15·0790	439	17·2838	495	19·4885	551	21·6933	607	23·8981	663	26·1028
384	15·1184	440	17·3231	496	19.5279	552	21·7327	608	23·9374	664	26·1422
385	15·1578	441	17·3625	497	19·5673	553	21·7720	609	23·9768	665	26·1816
386	15·1971	442	17·4019	498	19·6067	554	21·8114	610	24·0162	666	26·2209
387	15·2365	443	17·4413	499	19·6460	555	21·8508	611	24·0556	667	26·2603
388	15·2759	444	17·4806	500	19·6854	556	21·8902	612	24·0949	668	26·2997
389	15·3152	445	17·5200	501	19·7248	557	21·9295	613	24·1343	669	26·3391
390	15·3546	446	17·5594	502	19·7641	558	21·9689	614	24·1737	670	26·3784
391	15·3940	447	17·5987	503	19·8035	559	22·0083	615	24·2130	671	26·4178
392	15·4333	448	17·6381	504	19·8429	560	22·0476	616	24·2524	672	26·4572

Equivalents of Millimetres in Inches—*continued.*

Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches
673	26·4965	728	28·6619	783	30·8273	838	32·9927	893	35.1581	947	37·2841
674	26·5359	729	28·7013	784	30·8667	839	33·0321	894	35·1975	948	37·3235
675	26·5753	730	28·7407	785	30·9061	840	33·0715	895	35·2369	949	37·3629
676	26·6147	731	28·7800	786	30·9454	841	33·1108	896	35·2762	950	37·4023
677	26·6540	732	28·8194	787	30·9848	842	33·1502	897	35.3156	951	37·4416
678	26·6934	733	28·8588	788	31·0242	843	33·1896	898	35·3550	952	37·4810
679	26·7328	734	28·8982	789	31·0636	844	33·2289	899	35·3943	953	37·5204
680	26·7721	735	28·9375	790	31·1029	845	33·2683	900	35·4337	954	37·5597
681	26·8115	736	28·9769	791	31·1423	846	33·3077	901	35·4731	955	37·5991
682	26·8509	737	29·0163	792	31·1817	847	33·3471	902	35·5125	956	37·6385
683	26·8902	738	29·0556	793	31·2210	848	33·3864	903	35·5518	957	37·6778
684	26·9296	739	29·0950	794	31·2604	849	33·4258	904	35·5912	958	37·7172
685	26·9690	740	29·1344	795	31·2998	850	33·4652	905	35·6306	959	37·7566
686	27·0084	741	29·1738	796	31·3391	851	33·5045	906	35·6699	960	37·7960
687	27·0477	742	29·2131	797	31·3785	852	23·5439	907	35·7093	961	37·8353
688	27·0871	743	29·2525	798	31·4179	853	33·5833	908	35·7487	962	37·8747
689	27·1265	744	29·2919	799	31·4573	854	33·6227	909	35·7880	963	37·9141
690	27·1658	745	29·3312	800	31·4966	855	33·6620	910	35·8274	964	37·9534
691	27·2052	746	29·3706	801	31·5360	856	33·7014	911	35·8668	965	37·9928
692	27·2446	747	29·4100	802	31·5754	857	33·7408	912	35·9062	966	38·0322
693	27·2840	748	29·4494	803	31·6147	858	33·7801	913	35·9455	967	38·0716
694	27·3233	749	29·4887	804	31·6541	859	33·8195	914	35·9849	968	38·1109
695	27·3627	750	29·5281	805	31·6935	860	33·8589	915	36·0243	969	38·1503
696	27·4021	751	29·5675	806	31·7329	861	33·8983	916	36·0636	970	38·1897
697	27·4414	752	29·6068	807	31·7722	862	33·9376	917	36·1030	971	38·2290
698	27·4808	753	29·6462	808	31·8116	863	33·9770	918	36·1424	972	38·2684
699	27·5202	754	29·6856	809	31·8510	864	34·0164	919	36·1818	973	38·3078
700	27·5596	755	29·7249	810	31·8903	865	34·0557	920	36·2211	974	38·3471
701	27·5989	756	29·7643	811	31·9297	866	34·0951	921	36·2605	975	38·3865
702	27·6383	757	29·8037	812	31·9691	867	34·1345	922	36·2999	976	38·4259
703	27·6777	758	29·8431	813	32·0085	868	34·1738	923	36·3392	977	38·4653
704	27·7170	759	29·8824	814	32·0478	869	34·2132	924	36·3786	978	38·5046
705	27·7564	760	29·9218	815	32·0872	870	34·2526	925	36·4180	979	38·5440
706	27·7958	761	29·9612	816	32·1266	871	34·2920	926	36·4574	980	38·5834
707	27·8351	762	30·0005	817	32·1659	872	34·3313	927	36·4967	981	38·6227
708	27·8745	763	30·0399	818	32·2053	873	34·3707	928	36·5361	982	38·6621
709	27·9139	764	30·0793	819	32·2447	874	34·4101	929	36·5755	983	38·7015
710	27·9533	765	30·1187	820	32·2840	875	34·4494	930	36·6148	984	38·7409
711	27·9926	766	30·1580	821	32·3234	876	34·4888	931	36·6542	985	38·7802
712	28·0320	767	30·1974	822	32·3628	877	34·5282	932	36·6936	986	38·8196
713	28·0714	768	30·2368	823	32·4022	878	34·5676	933	36·7329	987	38·8590
714	28·1107	769	30·2761	824	32·4415	879	34·6069	934	36·7723	988	38·8983
715	28·1501	770	30·3155	825	32·4809	880	34·6463	935	36·8117	989	38·9377
716	28·1895	771	30·3549	826	32·5203	881	34·6857	936	36·8511	990	38·9771
717	28·2289	772	30·3942	827	32·5596	882	34·7250	937	36·8904	991	39·0165
718	28·2682	773	30·4336	828	32·5990	883	34·7644	938	36·9298	992	39·0558
719	28·3076	774	30·4730	829	32·6384	884	34·8038	939	36·9692	993	39·0952
720	28·3470	775	30·5124	830	32·6778	885	34.8431	940	37·0085	994	39·1346
721	28·3863	776	30·5517	831	32·7171	886	34·8825	941	37·0479	995	39·1739
722	28·4257	777	30·5911	832	32·7565	887	34·9219	942	37·0873	996	39·2133
723	28·4651	778	30·6305	833	32·7959	888	34·9613	943	37·1267	997	39·2527
724	28·5045	779	30·6698	834	32·8352	889	35·0006	944	37·1660	998	39·2920
725	28·5438	780	30·7092	835	32·8746	890	35·0400	945	37·2054	999	39·3314
726	28·5832	781	30·7486	836	32·9140	891	35·0794	946	37·2448	1000	39·3708
727	28·6226	782	30·7880	837	32·9534	892	35·1187				

Equivalents of Fractions of an Inch in Millimetres

Inch	Mm.	Inch	Mm.	Inch	Mm.	Inch	Mm.
1/64	·3969	17/64	6·7468	33/64	13·0966	49/64	19·4465
1/32	·7937	9/32	7·1436	17/32	13·4935	25/32	19·8434
3/64	1·1906	19/64	7·5405	35/64	13·8904	51/64	20·2403
1/16	1·5875	5/16	7·9374	9/16	14·2872	13/16	20·6371
5/64	1·9843	21/64	8·3342	37/64	14·6841	53/64	21·0340
3/32	2·3812	11/32	8·7311	19/32	15·0810	27/32	21·4309
7/64	2·7781	23/64	9·1280	39/64	15·4778	55/64	21·8277
1/8	3·1749	3/8	9·5248	5/8	15·8747	7/8	22·2246
9/64	3·5718	25/64	9·9217	41/64	16·2716	57/64	22·6215
5/32	3·9687	13/32	10·3186	21/32	16·6684	29/32	23·0183
11/64	4·3655	27/64	10·7154	43/64	17·0653	59/64	23·4152
3/16	4·7624	7/16	11·1123	11/16	17·4622	15/16	23·8121
13/64	5·1593	29/64	11·5092	45/64	17·8591	61/64	24·2089
7/32	5·5561	15/32	11·9060	23/32	18·2559	31/32	24·6058
15/64	5·9530	31/64	12·3029	47/64	18·6528	63/64	25·0027
1/4	6·3499	1/2	12·6998	3/4	19·0497	1	25·3995

Hydraulic Equivalents

1 imperial gallon = 277·274 cubic inches.
1 imperial gallon = 0·16045 cubic foot.
1 imperial gallon = 10 lb.
A cubic foot of sea water = 64·00 lb.
A cubic inch of sea water = 0·037037 lb.
A cubic foot of water = 62·32 lb.
A cubic inch of water = 0·03616 lb.
A cylindrical foot of water = 48·96 lb.
A cylindrical inch of water = 0·0284 lb.
A column of water 12 in. long 1 in. square = 0·434 lb.
A column of water 12 in. long 1 in. diameter = 0·340 lb.
The capacity of a 12 in. cube = 6·232 gallons.
The capacity of a 1 in. square 1 ft. long = 0·0434 gallons.
The capacity of a 1 ft. diameter 1 ft. long = 4·896 gallons.
The capacity of a cylinder in gallons 1 yd. long = 0.1 diameter, squared.
The capacity of a 1 in. diameter 1 ft. long = 0·034 gallons.
The capacity of a cylindrical inch = 0·002832 gallons.
The capacity of a cubic inch = 0·003606 gallons.
The capacity of a sphere 12 in. diameter = 3·263 gallons.
The capacity of a sphere 1 in. diameter = 0·00188 gallons.
1 imperial gallon = 1·2 United States gallons.
1 imperial gallon = 4·543 litres of water.
1 United States gallon = 231·0 cubic inches.
1 United States gallon = 0·83 imperial gallons.
1 United States gallon = 3·8 litres of water.
1 cubic of water = 6·232 imperial gallons.
1 cubic foot of water = 7·476 United States gallons.
1 cubic foot of water = 28·375 litres of water.
1 litre of water = 0·22 imperial gallons.
1 litre of water = 0·264 United States gallons.
1 litre of water = 61·0 cubic inches.
1 litre of water = 0·0353 cubic foot.

Alphabetical Index

Figure Number Index

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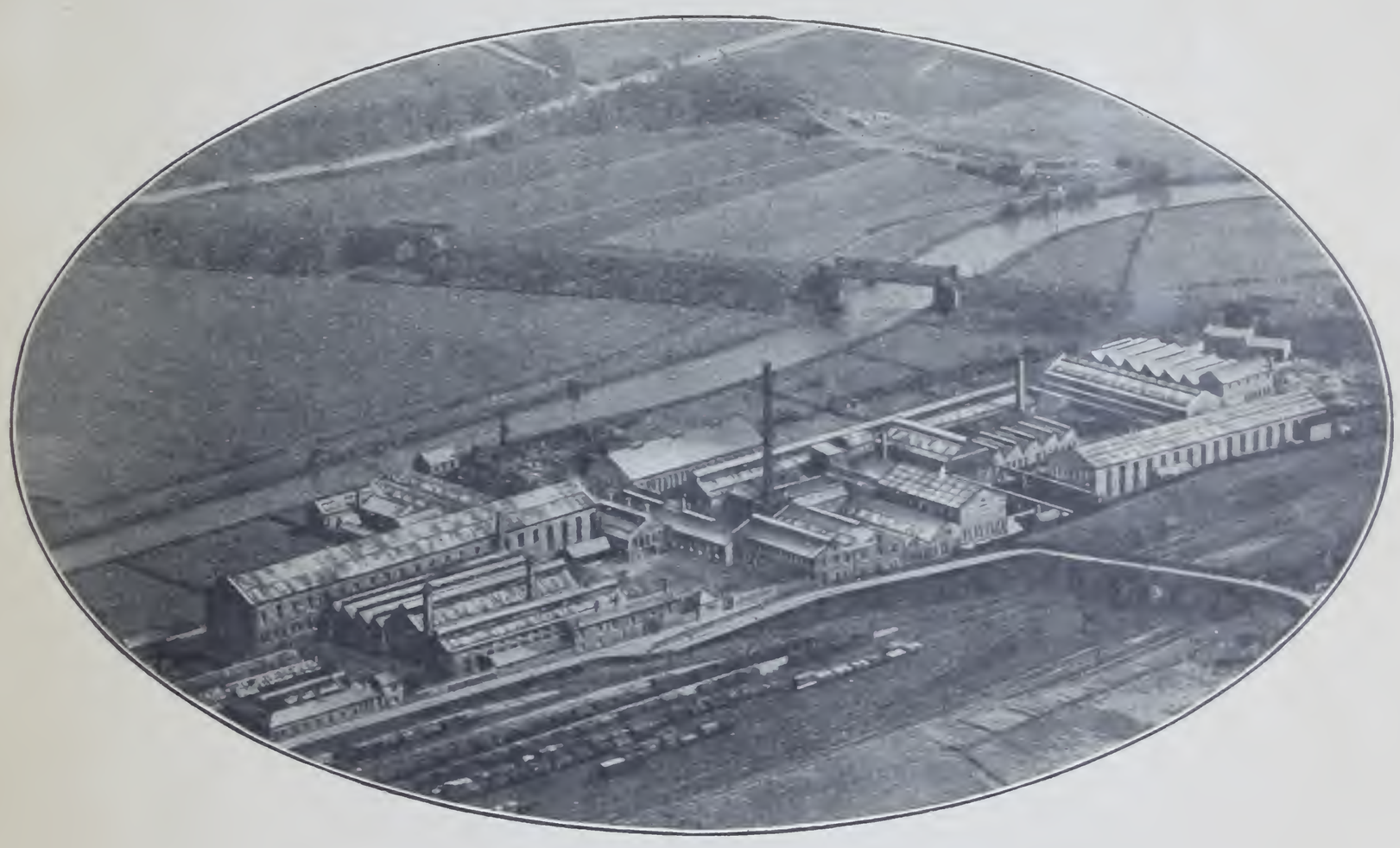

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